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STATE DOCUMENTS

THIRD ANNUAL REPORT

*[Jun 1977]*

OF

INSPECTOR OF MINES,

AND

Deputy Inspector of Mines,

FOR THE

FISCAL YEAR 1891.

BY

JOSEPH HOGAN,

*Inspector.*

JACOB OLIVER,

*Deputy.*

JOURNAL PUBLISHING CO.  
HELENA, MONT.

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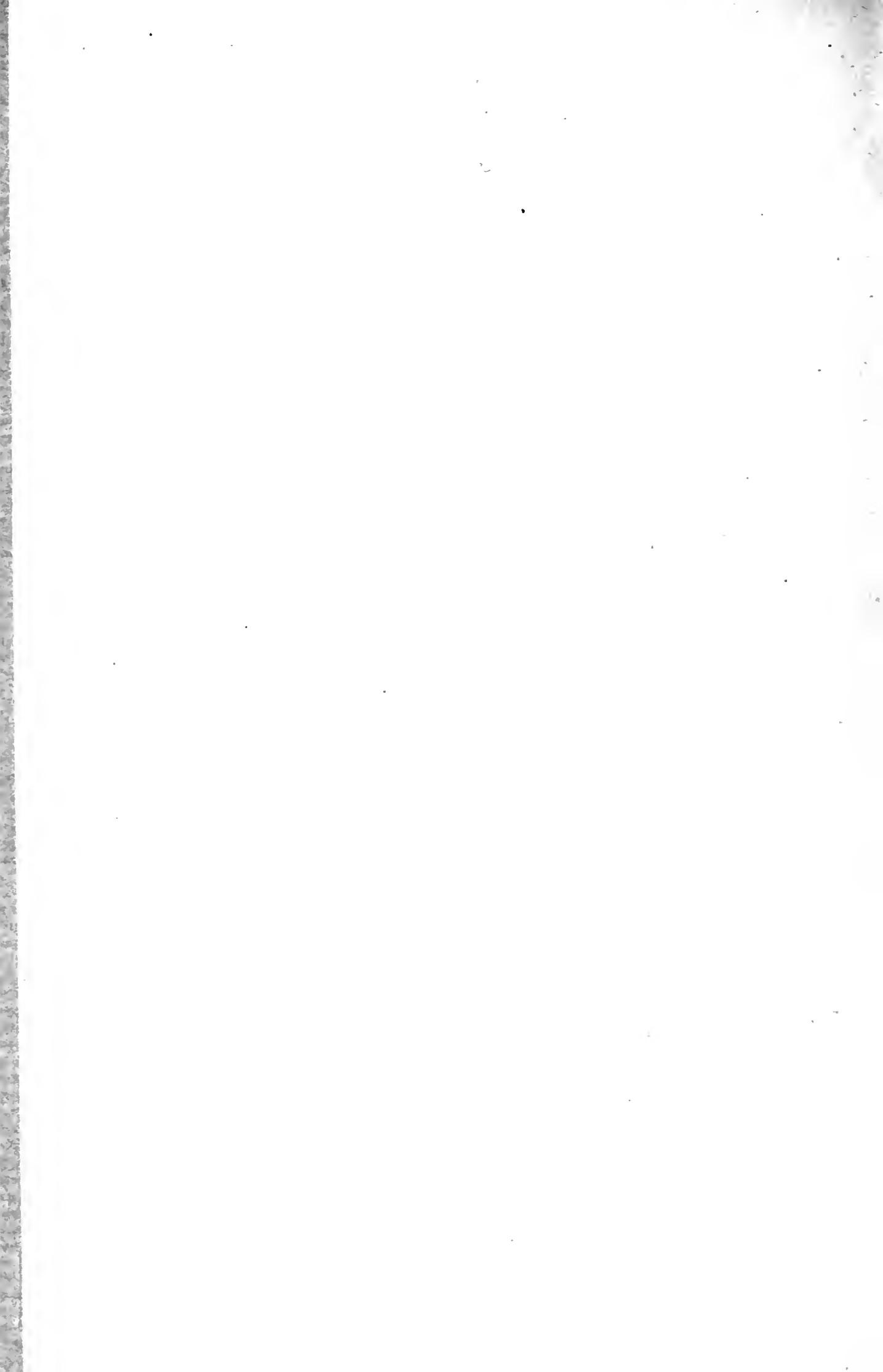
JOSEPH HOGAN,  
JACOB OLIVER,

*Inspector.*  
*Deputy.*

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HELENA, MONTANA, December 1, 1891.

*To His Excellency, JOSEPH K. TOOLE,  
Governor of Montana:*

I have the honor herewith to submit my report on condition of mines and accidents in the same from February 7 to December 1, 1891.

Also the report on accidents of Jacob Oliver, Deputy Inspector of Mines. I have personally investigated the causes of thirty-two fatal and twenty-five non-fatal accidents. The result of investigation is treated more extensively in my report. In cases where I was not notified immediately they pleaded ignorance of the law and promised to be more prompt in future.

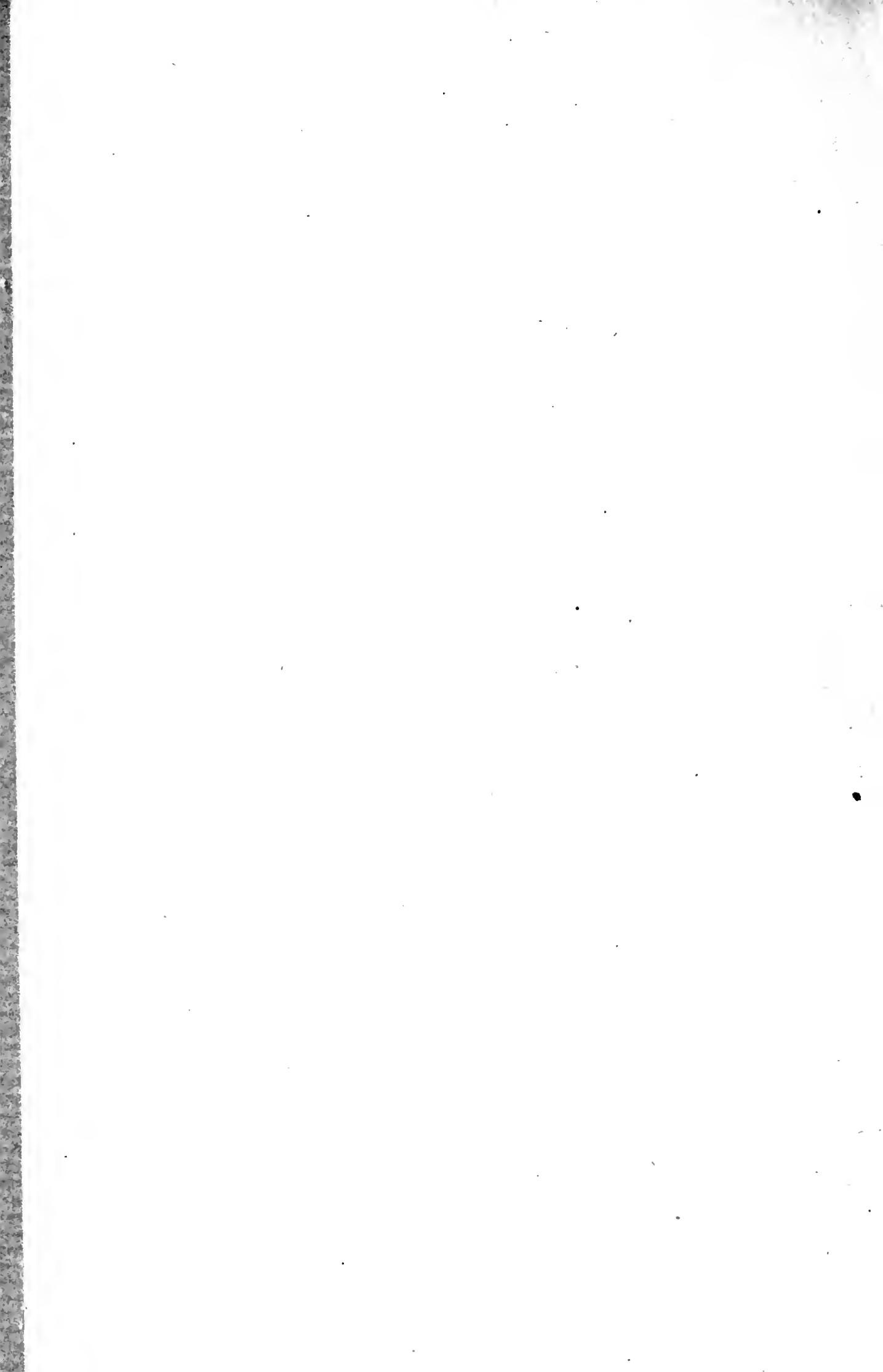
I further refer you to my report on quartz and coal mines that I visited.

Respectfully submitted,

Your obedient servant,

JOSEPH HOGAN,

*Inspector of Mines.*



## MINING IN MONTANA.

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Mining continues to be the leading industry of the State. Every day adds a few more to the list of new locations discovered and mining claims developed into paying properties.

The old quartz mines continue to grow in value as they acquire depth, and are developed on a large scale, showing that nature has bestowed our mountains with untold wealth. Many mining claims that had been patented several years ago and left lie idle have been opened up during the past summer with very good results. Although our largest copper mines have been closed for a period of seven months, the output of valuable metals will equal that of last years, if not exceed it.

### COAL MINING.

In the lignite coal field, where the vein is large, at Red Lodge and Sand Coulee, the workings are quite extensive, and when running to their full capacity are capable of supplying a large amount of coal each day. At Cokedale, Timberline and Horr is found the bituminous coal. The vein is not so large but has a fair capacity and the output is steadily on the increase. In Choteau, Fergus, Meagher and Missoula Counties considerable coal land has been taken up during the past summer, and Montana at no distant day is destined to become a great coal producer, as well as the leading mineral producer of the world.

And owing to the amount of machinery and power required in mining and the vast amount of fuel used in reducing the ores there is more coal consumed in this State, in proportion to the population, than in any other State, consequently affording a good market for coal and coke.

## LIST OF FATAL ACCIDENTS.

DATE.	NAME.	COUNTY.	NAME OF MINE.	OCCUPATION	REMARKS.
1891					
February 10 . . . . .	Anton Wengenbach . . . . .	Lewis and Clarke . . . . .	Drum Lunnon . . . . .	Station Tender . . . . .	Killed in shaft . . . . .
" 16 . . . . .	Robert Lind . . . . .	C. Seadle . . . . .	Sand Coulee . . . . .	Coal Miner . . . . .	Killed by fall of coal . . . . .
" 26 . . . . .	Alfred McQuold . . . . .	Silver Bow . . . . .	Gambetta . . . . .	Miner . . . . .	Fall of ground . . . . .
March 6 . . . . .	John Kallen . . . . .	Beaverhead . . . . .	Cleopatra . . . . .	Timberman . . . . .	Fall of rock . . . . .
March 9 . . . . .	John Doogan . . . . .	Deer Lodge . . . . .	Ensign Granite . . . . .	Miner . . . . .	Killed by explosion caused by missed hole . . . . .
March 23 . . . . .	Walter Lloyd . . . . .	Park . . . . .	Rocky Fork Coal Mine No. 6 . . . . .	Coal Miner . . . . .	Run over by mine car . . . . .
May 5 . . . . .	John O. D. Young . . . . .	Lewis and Clarke . . . . .	Drum Lunnon . . . . .	Day Laborer . . . . .	Smothered between the 400 and 500-ft. level . . . . .
May 7 . . . . .	Wm. John Reed . . . . .	" . . . . .	Empire . . . . .	Miner . . . . .	Fall 15' down manway . . . . .
May 17 . . . . .	Edward James . . . . .	Silver Bow . . . . .	United . . . . .	" . . . . .	Fall of ground . . . . .
May 30 . . . . .	James Healy . . . . .	" . . . . .	Silver Bow Mine . . . . .	" . . . . .	Leg broken by fall of ground. Died later from his injuries . . . . .
June 5 . . . . .	Jerry Downey . . . . .	Deer Lodge . . . . .	Bl. Metallic . . . . .	" . . . . .	Killed in shaft by blast . . . . .
June 28 . . . . .	Barnet Thomas . . . . .	Silver Bow . . . . .	East Colusa . . . . .	" . . . . .	Thigh broken by stick of timbers falling on him . . . . .
July 11 . . . . .	Mat Klemmla . . . . .	Park . . . . .	Rocky Fork Coal Mine . . . . .	Coal Miner . . . . .	Died later from injuries . . . . .
July 12 . . . . .	John Costa . . . . .	" . . . . .	Livingston Coal and Coke Co. Mine . . . . .	" . . . . .	Died by flying coal from a blast . . . . .
September 8 . . . . .	Claude Tardieu . . . . .	Missoula . . . . .	Curlew . . . . .	Carpenter . . . . .	Killed by striking against the timbers when riding on cars . . . . .
October 9 . . . . .	Hugh P. Hanrahan . . . . .	Deer Lodge . . . . .	Granite Mountain . . . . .	Miner . . . . .	Killed by cage striking him on the head . . . . .
October 9 . . . . .	Michael Epp . . . . .	Silver Bow . . . . .	Granite Squirrel . . . . .	" . . . . .	Killed by premature explosion . . . . .
October 13 . . . . .	Wm. J. Goyens . . . . .	Beaverhead . . . . .	Cleopatra . . . . .	" . . . . .	Killed by bucket falling on him . . . . .
October 12 . . . . .	Dominic McElhenney . . . . .	Deer Lodge . . . . .	Mario . . . . .	" . . . . .	Killed by fall of rock . . . . .
October 15 . . . . .	Patrick Adams . . . . .	Park . . . . .	Rocky Fork Coal Co. . . . .	Coal Miner . . . . .	Killed by falling from bucket in shaft . . . . .
October 15 . . . . .	Thomas Stewart . . . . .	" . . . . .	" . . . . .	" . . . . .	Killed by cave of ground . . . . .
November 2 . . . . .	Charles Stoker . . . . .	" . . . . .	" . . . . .	" . . . . .	Killed by fall of rock . . . . .
November 3 . . . . .	James O. Donnell . . . . .	Silver Bow . . . . .	Anaconda . . . . .	Mine . . . . .	Killed in the shaft by falling from cage, when coming up . . . . .
November 3 . . . . .	William Martin . . . . .	" . . . . .	" . . . . .	" . . . . .	" . . . . .
November 3 . . . . .	Patrick Mulligan . . . . .	" . . . . .	" . . . . .	" . . . . .	" . . . . .
November 3 . . . . .	Jane, or Sullivan . . . . .	" . . . . .	" . . . . .	" . . . . .	" . . . . .
November 3 . . . . .	James Touch . . . . .	" . . . . .	" . . . . .	" . . . . .	" . . . . .
November 3 . . . . .	Charles M. Evans . . . . .	" . . . . .	" . . . . .	" . . . . .	" . . . . .
November 3 . . . . .	Michael McEvoy . . . . .	" . . . . .	" . . . . .	" . . . . .	" . . . . .
November 3 . . . . .	Dennis Shangnessy . . . . .	" . . . . .	" . . . . .	" . . . . .	" . . . . .
November 3 . . . . .	John Ritchie . . . . .	" . . . . .	" . . . . .	" . . . . .	" . . . . .
November 30 . . . . .	John Eskolo . . . . .	Jefferson . . . . .	Alta . . . . .	Driver . . . . .	Sustained injuries from which he afterward died . . . . .
					Killed by ear running over him . . . . .

## LIST OF NON-FATAL ACCIDENTS.

### STATE OF MONTANA.

DATE.	NAME.	COUNTY.	NAME OF MINE.	OCCUPATION.	REMARKS.
1891 February 26 . . . . .	Christ. Schwitzer James A. Gilliland . . . . .	Silver Bow Deer Lodge . . . . .	Vulcan . . . . . East Granite . . . . .	Miner . . . . . " . . . . .	Leg broken by fall of ground. Injured hand and back, caused by explosion of missed hole.
March 9 . . . . .	Patrick Boyle . . . . .	" . . . . .	" . . . . .	" . . . . .	Injured about the face and body. Caused by ex- plosion of missed hole.
March 11 . . . . .	Robert T. Turner . . . . .	Silver Bow . . . . .	Gagnon . . . . . " . . . . .	Machinist . . . . .	Right leg broken below the knee, and left arm broken in two places. Caused by skip drop- ping with him about 130 feet.
April 17 . . . . .	Stephen Daddow . . . . .	Deer Lodge . . . . .	Granite Mountain . . . . .	Miner . . . . .	Leg broken above the ankle. Cage dropping 200 feet.
April 16 . . . . .	A. C. Curnow . . . . .	" . . . . .	" . . . . .	" . . . . .	Knee dislocated and ankle sprain d.
April 17 . . . . .	Joseph Giles . . . . .	" . . . . .	" . . . . .	" . . . . .	Sustained injuries of knee, back and shoulders.
April 17 . . . . .	Edwin Waters . . . . .	" . . . . .	" . . . . .	" . . . . .	Ankle sprained.
April 17 . . . . .	E. A. Wayne . . . . .	" . . . . .	" . . . . .	" . . . . .	Ribs broken and injured about the back.
April 17 . . . . .	Geo. Kelly . . . . .	" . . . . .	" . . . . .	" . . . . .	Both ankles sprained.
May 24 . . . . .	Gus Ehrenberg . . . . .	Jefferson . . . . . Deer Lodge . . . . .	C. & D. Bi-Metallic . . . . . Gimber . . . . .	" . . . . . " . . . . .	Collar, bone broken by fall of ground.
June 5 . . . . .	John Hurley . . . . .	Ole Johnson . . . . .	" . . . . .	" . . . . .	Injured about the hips by premature explosion.
June 19 . . . . .	Ole Johnson . . . . .	" . . . . .	" . . . . .	" . . . . .	Left leg fractured above the knee in two places, and right leg fractur d above the ankle.—
July 8 . . . . .	P. H. Smyth . . . . .	Silver Bow . . . . .	Elvina . . . . . Shonbar . . . . .	" . . . . . " . . . . .	Caught by cage.
July 26 . . . . .	William Board . . . . .	Park . . . . . Deer Lodge . . . . .	Park Coal & Coke Co. Champion . . . . .	Coal Miner . . . . . Miner . . . . .	Badly bruised by explosion.
August 5 . . . . .	Henry H. Williams . . . . .	" . . . . .	" . . . . .	" . . . . .	Back and hips injured and head cut, by fall of ground.
August 20 . . . . .	Thomas Mulholland . . . . .	" . . . . .	" . . . . .	" . . . . .	Ankle hurt by rock falling on it.
August 25 . . . . .	Daniel Holland . . . . .	Silver Bow . . . . .	Ort Butte . . . . .	" . . . . .	Lost left eye and cut about the chest, by caps ex- ploding.
September 3 . . . . .	David J. Thomas . . . . .	Park . . . . . Deer Lodge . . . . .	Livingston Coal and Coke Co . . . . . Granite Mountain . . . . .	Coal Miner . . . . . Miner . . . . .	Leg broken in two places by bucket, crosshead and 50 feet of rope falling in shaft, striking him.
September 9 . . . . .	D. D. McDonal l . . . . .	Meagher . . . . .	Cumberland . . . . .	" . . . . .	Hip crushed by fall of ground.
September 11 . . . . .	Frank Peterson . . . . .	Jefferson . . . . .	H & H . . . . .	" . . . . .	Injured about face and eyes by explosion.
September 18 . . . . .	Thomas Lynn . . . . .	Silver Bow . . . . .	Ground Squirrel . . . . .	" . . . . .	Buck hurt by fall of rock.
October 1 . . . . .	Thomas Lynch . . . . .	" . . . . .	" . . . . .	" . . . . .	Received several flesh wounds by caps exploding.
October 31 . . . . .	Patrick McVarry . . . . .	" . . . . .	Mountain Consolidated . . . . .	" . . . . .	Shoulder blade broken by crosshead fall ng on him.
November 3 . . . . .	Jerry Harrington . . . . .	" . . . . .	Anaconda . . . . .	Station Tender . . . . .	Left leg broken by cage running away.
				Miner . . . . .	Injured on leg by cage in shaft.

On February 10, 1891, Anton Wengenbach was killed in the shaft of the Drum Lummon mine, Marysville. He was employed as station tender and was on the 1,000 foot level. The top car man sent down drills, some were to be taken off on the 1,000-foot station and others were to go to the 1,200. The drills for the 1,000-foot station were removed from the car and put on the station. The engineer was given the regular signal for the 1,200. I think that when the cage landed at the 1,000-foot level he unhooked the car on the cage before noticing the drills and forgot to hook it again. When the signal was given he got in the car to go to the 1,200 to leave the remaining drills, which was part of his duty as station tender. When the cage was lowered the car struck the wall plate and turned upside down, throwing him and the drills out. A long drill stuck in the lagin and stopped the cage. Mr. Wengenbach was found dead at the station setts for the 1,100-foot level. No one was present when the accident occurred, but according to the evidence given before the Coroner's jury, and what I could learn about the same, I do not think blame could be attached to anyone.

On February 16, 1891, Robert Lind, a miner working in the Sand Coulee coal mine, was killed by a fall of coal. According to the testimony of Sacre Dehe, who was in the room, and the only one present at the time of the accident, Robert Lind took a pick and started mining; was there but a short time when a large mass of loose coal fell, killing him instantly. The Coroner's jury returned a verdict exonerating the Company. I was not notified.

On February 26, 1891, Alfred McQuoid, while working on the first floor of the 550-foot level of the Gambetta mine, Meaderville, was injured by a fall of ground, from which he died next day. I was not notified, therefore knew nothing of the cause of the accident. At the time the mine was leased by Cosgrove & Company.

On February 26, 1891, Christ Schwitzer, a miner employed in the Vulcan mine, while working in the shaft, had his leg broken and sustained other injuries about the chest, from which he recovered. I was not notified and did not investigate cause of accident.

John Killen, employed as timberman at the Cleopatra mine for the Hecla Mining Co., at Lyon City, was killed on the 6th of March, 1891. John Killen, with another timberman named Gilbert, were working in what is known as "Bull Run"

stope, making ready for a set of timbers. James Frazer was mining in the stope and present at the time of the accident. The ground above was stoped out and timbered with stulls. They were going through this on the bottom bench and timbering it with sets. There was an old stull standing at the edge with the ground worked out under it. John Killen took the stull out, sounded the ground, and said it was all right. He started shoveling the dirt back; had been shoveling but a short time when a rock weighing about 400 pounds fell from above, striking him on the head, killing him instantly. According to the sworn statement of James Frazer and James Gilbert I dont think blame could be attached to any one.

On the 9th of March, 1891, James A. Gillfillan, James McGinley, Patrick Boyle and John Doogan were employed on the morning shift in the shaft of the East Granite mine. As each shift were working eight hours Doogan had charge of this shift. He was what is commonly called "a pusher." Between eleven and twelve o'clock they loaded seven or eight holes and fired them. All the holes exploded with one exception, of which fact they were perfectly aware. But after having lunch, concluded to load dirt and work until the 3 o'clock shift came on, then tell them about the missed hole and let them blast it. At about 2:30 o'clock some were loading the bucket and Doogan was picking close to the missed hole when the explosion occurred. Doogan sustained injuries from which he died March 14th. Gillfillan and Boyle were badly injured, but afterwards recovered. McGinley received the least injuries of any. It was miraculous they escaped as they did.

According to the sworn statement of James Gillfillan and James McGinley they were allowed to use their own judgment in protecting themselves against accidents, therefore they had none but themselves to blame.

On the 11th of March, 1891, Robert T. Turner, machinist at the Gagnon, Butte, met with a serious accident, having his right leg broken below the knee and his left arm broken in two places. While being hoisted from the 1,000-foot level, and when between the 800 and 900 levels the engine became unclutched and the skip fell to the bottom. Turner was coming up on the east skip and the engineer was landing the west skip at the 800-foot level. It seems reasonable that an accident of this kind could not occur without some person being responsible. I think if the engine was properly clutched it could not become unclutched by the jarring or shaking. It was evident that it was clutched or the brake drawn back, although not in the safety

notch or the skip would not be raised 130 feet up the shaft. The engineer might have accidentally unclutched the wrong side and the skip got a start he was unable to stop it until it landed on the bottom. Accidents of this kind could be guarded against by having a man to attend to the brakes, besides the man that is running the engine.

Walter Lloyd, a coal miner working in the Rocky Fork Coal Mine, at Red Lodge, was killed March 23rd, 1891. He was working with his son in room No. 6. The vein of coal pitches at an angle of about 19 degrees. A double track is laid in each room, the cars are let down to the entry and the others pulled up by a Gravity Haulage machine. The brake is then fastened, and a piece of rope, tied to the car, is then made fast to a post set in for the purpose, commonly called by coal miners "a snubbing post." This is done to keep the car in place until loaded. Besides this most miners put a prop against the lower end of the car. According to the statement of witnesses present Lloyd did not fasten the car to the post, but had placed a prop against the lower end. While loading the car, and standing below it it became loose and, running over him, killed him instantly. The jury decided that blame could not be attached to any one, as it was the result of his own carelessness.

On the 17th of April there was a serious accident in the Granite Mountain mine, caused by the cage falling from the 900 to the 1,100-foot level. It occurred as the men were coming off night shift, and there were eight men on the cage at the time.

Stephen Daddow had his leg broken above the ankle.

A. C. Curnow, knee dislocated and ankle sprained.

Joseph Giles sustained injuries of the knee, back and shoulder.

Edwin Waters, ankle sprained.

E. A. Wayne, rib broken and injured in the back.

George Kelly, both ankles sprained.

John Ross and William Trudgeon escaped without any serious injuries. I saw all the above named persons and their statements were that they were on the station at the 900-foot level. The station tender, Duke McFarland was there also. The cage was standing in the shaft and the station tender told them

to get on. The cage remained there until the eighth man got on when it dropped to the 1,100, striking on the bulkheading that was in the shaft. The engineers on duty at the time it occurred were Alex McFarland, on the west side where the accident happened, and S. M. Black, on the east side. Alex McFarland's statement was that they were hoisting steadily until 3:25 a. m., when he lowered the cage to the 900-foot level, tightened the brake as usual and went upon the brakes to see about something; was there but a short time when the cage started down the shaft. He called to S. M. Black, who was standing with his back to the reel. Black says when he got to the brake the thumb screw was in its proper place and that the brake was on. Both engineers claim to have swung on the brake and tightened it all they could, but could not stop the cage until it struck below.

All eight men certainly had a narrow escape with their lives although the injuries sustained by some of them will make them cripples for life

My opinion is that the brake was put on when the iron and wood were hot from being run steadily. As it got cool it contracted some. The bearing surface of the brake was not wide enough to make the friction required to hold a loaded cage after it having a start at that depth, and the engineers were not at their posts.

The clutch on the engine is a friction and it could have been clutched while the cage was running away, and probably the result might not have been so disastrous.

On the 5th day of March, 1891, John O'Donovan was killed in the Drum Lummon mine, at Marysville. He was employed as day laborer, and on the morning of the 5th the foreman put him to work cleaning out a chute that is south of No. 2 shaft, on what is called the 400-foot level. It was about twelve feet in length and was used to dump waste down into the stopes that are worked out between the 400 and 500-foot levels. The dirt filled up to the mouth of the chute and the chute was filled up to the level. The waste in these stopes was taken out of a chute on the 500 and dumped in stopes between the 600 and 700.

The foreman's statement is that he ordered O'Donovan to shovel some of the waste from the top of the chute and then get a stick of powder and blast the side out of it, so the waste would run.

Walter Hambridge, the last person that seen O'Donovan alive, says, at 9:30 a. m. he gave him two sticks of powder and about ten feet of fuse. At about 4 p. m. he was missed and they began searching for him. During the day the waste was being drawn from the chute on the 300-foot level, and meanwhile the waste had run from below and in the chute on the 400, where John O'Donovan was put at work. His candle stick was found in the lower part of the chute, where he had evidently placed it. There was no sign that the chute was blasted or that he had used the powder. His body was found about half way between the 400 and 500, buried in the waste.

Dr. G. W. King, who examined the body after it was taken out, testified before the jury that death was caused from suffocation.

From what I could learn about it I think the waste around the lower part of the chute had run down in the stope so he could get at the lower end, and while there working to start the waste in the chute it came down and caught and carried him down to where he was found in the stope.

On the 7th of May, 1891, Wm. John Reed was killed in the Empire mine, at Empire..

He was working in a stope on what is called the 300-foot level, with a man named William Jenkins. In going to and coming from their work they went through the manway from what is called the 500-foot level, a distance of 180 feet. The level connects with the main tunnel that leads to the surface, and through which the mine is worked.

In going to their work at 1 o'clock Jenkins went up the manway first, followed by Reed, who was carrying an ax. When Jenkins reached the level he went over to the chute where they were at work. He heard Reed fall; could not say whether he had reached the level or was a few steps below on the ladder. The body was found about 125 feet below on a pillar of ground that was not worked out. Above this the ground was worked out and timbered with stulls.

I examined the manway and ladders and found them in good condition. Jenkins was the only one that knew anything about it, as he was the only one there when it occurred.

On the 17th of May, 1891, Edward James, a miner employed in the Vulcan mine, was seriously injured by a fall of ground, from the effects of which he died some time later.

According to the sworn statement of W. M. Hammond, who was present at the time, they were working in a stope on the 250-foot level. There was some loose ground above the chute and James said he would have to take it down or blast it, as it had to be removed to make room for timbers. James was working under this ground when it fell upon him.

On May 24th, 1891, Gus Ehrenberg, employed as a miner in the C and D mine at Elkhorn, met with a very painful accident having his collar bone broken. He was working in the south stope picking some ore when five or six tons of loose dirt fell upon him. He said no one was to blame.

The stope was timbered with stulls. Accidents of this kind might be prevented by timbering the stopes with sets and using lagging where needed.

On May 30, 1891, James Healey, a miner working in the Silver Bow mine, No. 1, for the Butte & Boston Co., had his leg broken. He afterwards died from injuries received. I did not investigate how it occurred as I was not notified.

On the 5th of June, 1891, Jerry Downey, a miner employed in the Fanny Parnell shaft for the Bi-Metallic Co. at Granite, was killed by a blast, and John Hurley received some wounds about the hips. John Tredenwick and John A. Harris, who were working with them, escaped without being injured. They were working on the morning shift, and at 11:30 a. m. they gave the blasting signal to the engineer. He answered it with the usual signal by raising the bucket from the bottom and lowering it.

They spit seven holes and all four of the men got on the bucket, but they could not find the bell rope to signal the engineer. Failing to find the rope they started to climb the rope attached to the bucket. John Tredenwick first, John A. Harris followed him and then Hurley. There was nothing to show that Downey got on the rope. After the first shot went off the men called to Downey but received no reply. The engineer hearing the shot started to hoist slowly and brought the three men to the surface.

Downey's body was found at the bottom of the shaft.

I examined the shaft and the rope attached to the bell for giving the signal and it was in good condition. It is possible after Harris gave the signal he might have let go the rope quick and it swung over and got on the crosshead, or else some of the men in getting on the bucket got the end back of him, where they could not find it readily. They got excited and started to climb the rope, and Downey, being last, some flying rock from the blast struck him and knocked him off the bucket.

The jury exonerated all persons from blame.

Ole Johnson was injured in the shaft of the Cumberland mine at Castle on the 19th of June, 1891.

Johnson and another man were working four sets above the level east of the pump compartment cutting out a tank to catch the surface water that was running down the shaft.

One of the car men called him to inquire if a certain man was there with them. Johnson crossed over on the east cage to the west compartment. The west cage coming down the shaft struck him and he was caught between the wall plate and the cage. The man at the station signaled the engineer and he stopped the cage. Then he signaled for him to raise the cage and Johnson fell down on the station. His left leg above the knee, was fractured in two places and his right leg fractured above the ankle, and he was injured about the back.

It was not necessary for him to go to the west compartment. The manway and pump compartment were covered with boards. By raising one of these he could talk with the man on the station.

Barnet Thomas, a miner working in the East Colusa mine at Meaderville, met with a serious accident on the 28th of June, 1891, which resulted in his death July 17th, 1891.

Barnet Thomas and his partner were working one floor above the cilled floor getting up some timbers. His statement to me after he was hurt was that they were behind with this work and he was in a hurry and put one-half hitch on the timbers instead of two. His partner was above drawing up the timbers. When he had drawn the stick about seven feet the rope slipped and the timber fell and struck him, breaking his thigh bone. He said he was to blame as he ought to have fastened the rope better.

On the 8th of July, 1891. P. H. Smyth, a miner working in the shaft of the Elvina mine, for R. D. Seggat, had a very narrow

escape with his life. They were spitting five holes and when four of them were spit their light quenched. They could not find the bell rope and started to climb the ladders. When he was up about ten feet one of the holes went off. The force of the concussion knocked him from the ladder and he fell to the bottom and was there when the other holes exploded. He received several bad bruises and a wounded thigh.

John Costa, a miner working for the Livingston Coal and Coke Company at Cokedale, on the 12th of July, 1891, received injuries from which he afterwards died.

Costa and Louis Johnson were cleaning the loose coal and dirt that were on the track of the slope by shoveling it into a pit car and when the car was filled would ride up on the car and unload it. They had cleaned the track down about 300 feet —about 60 feet below the bridge that is used to run the car into the first lift from the slope.

This bridge is much lower than the other timbers in the slope, and persons riding on the front bumpers must stoop to avoid being caught against the timbers.

Johnson rode on one side and Costa on the side where the bell rope was. According to Johnson's statement when they had loaded the car Costa gave the engineer the signal to start where about sixty feet below the bridge. He was on the front end of the car and did not notice how Costa sat. When they got under the bridge Costa said, "I am killed." Johnson signaled the engineer to stop and found him doubled up on top of the car. A man on top of a loaded car could not pass under the bridge without being caught. Costa must have forgotten this and sat upon the front end of the car.

On the 11th of July, 1891, Mat Klemila, a coal miner employed by the Rocky Fork Coal Co. in their mine at Red Lodge, was killed.

He was at work in room 102, in mine No. 4. The men working in the next room were driving a cross cut through the pillar. They notified Klemila that they were ready to blast. His partner got out of the way but Klemila did not, when the shot went off. It broke through the pillar and a piece of coal from it struck Klemila, killing him instantly.

The Coroner's jury gave a verdict that he was killed through his own neglect.

July 26th, 1891, William Board, a miner working in the Shonbar mine, Butte, was injured about the back and hips and had his head cut, from a fall of ground. He was working in the east drift of the 400-foot level. There was loose ground at the face of the drift. He told me he knew it was not good but thought it would not fall on him. He wanted to put in some boards on the bottom of the drift, but there being some waste there that had to be shoveled back, he started to shovel, having his back to the face of the drift, when the ground fell on him.

Harry H. Williams, a coal miner employed by the Park Coal and Coke Co., in their mine at Horr, met with an accident on the 5th of August, 1891. He was at work in a room on what is known as the middle entry, taking down some rock. A piece of it fell, striking him on the ankle, making a very painful bruise.

On the 20th of August, 1891, Thomas Mulholland, a miner employed in the Champion mine, at Champion, met with a very serious accident, from which he lost his left eye and was badly cut about the chest. He went out to the station where the caps were. There were two boxes, one filled and the other contained five. Both boxes were uncovered. He put a cap on his fuse and was reaching for another when the explosion occurred. He said he did not know what caused the cap to explode, that his candle stuck quite a distance from the shelf where the caps were.

Daniel Holland, a miner employed at the Ora Butte mine, Butte, was injured on the 25th of August, 1891.

I was not notified and did not investigate at the time it occurred. I was there some time later and got Mr. Holland's statement of how it occurred. "I was working in the shaft, about 100 feet down; was picking on the bottom. Mr. Cahill, who had charge of the work, was on top handling the engine. The bucket, crosshead, and 50 feet of rope fell down, striking me and broke my leg in two places, between the ankel and knee."

David J. Thomas, a miner working for the Livingston Coke and Coal Co., at Cokedale, on September 3, 1891, met with an accident, having his hip crushed. He was at work on the bottom lift, east, and was making room for a set of timbers. He said he sounded the ground over him, and while it seemed loose he did not think it would fall. While working there a boulder of rock, weighing over a ton, fell, glanced his right hip and crushed

it. He was fortunate to escape with as little injuries as he did. He said, "It might have been through a little carelessness on his part," that caused the accident.

On September 8, 1891, Claude Tardeville, a carpenter employed in the Curlew mine, near Victor, Missoula County, was killed by the cage striking him on the head.

He was at work in the pump compartment, about twenty feet above the 200-foot level, putting in guides. They were preparing to commence sinking and the dirt from the shaft was to be hoisted with a bucket through this compartment. About 9 a. m. the man working with him went on top for something. Tardeville must have put his head over into the other compartment, where they were hoisting. The cage struck him on the head, crushing it. He was found later in the sump at the bottom of the shaft. No one was present when the accident occurred. I learned that he had never worked very much in or around a mine before.

On September 9, 1891, a premature explosion occurred at the Granite Mountain mine, Granite, by which Hugh P. Hanratty was instantly killed and D. D. McDonald, the man working with him, was seriously injured about the face and eyes. I saw McDonald two days later. He said they were working in the crosscut breaking waste to fill the stopes that had been worked out between the 600 and 700-foot levels. They blasted fourteen holes, that were drilled by the machine, in the forenoon. The holes did not break. When they returned from lunch they loaded all the holes again tamping the down holes with dirt, and in the back holes used old sacks to cover and tamp the powder. McDonald stated that the fuse had been cut by the powder man and was six or seven feet in length. When they were ready to fire the holes he was about ten feet back and was counting, and Hanratty was spitting the fuse. When he got the ninth spit one of the holes exploded. The flying dirt and concussion knocked McDonald down and quenched the light. He crawled out, and was out some distance when the other holes exploded and Hanratty was found dead a short distance from the face of the cross cut. I think fourteen holes too many for one to spit, nor do I see the necessity for it when two men are present. McDonald said that it was not over one-half minute from the time the first hole was spit when the explosion occurred. I believe the fire went through the fuse that caused the explosion, and unless there was something wrong with the fuse it could not burn through six feet in one-half minute.

Another theory is, the holes being blasted before they were big and the powder in them not well covered, and a spark of fire from the burning fuse set the powder on fire . This being the case the powder would blaze before exploding. McDonald said he saw no blaze.

September 11, 1891, Frank Peterson was injured by a fall of rock in the Cumberland mine, at Castle. He was at work in a dirft from the 600-foot station in the winze and somerock fell from the back of the drift and struck him on the back, causing some severe bruises.

September 18, 1891, Thomas Lynn, a miner employed in the H and H mine, at Placer, met with a painful accident. He was preparing af use to fire a hole. After putting a cap on the fuse he put on a board to crimp the edge of it so it would not fall off the fuse. About three feet away from him, on the same board, was a box of caps, about two-thirds filled. The cap he had exploded and also the caps in the box, inflicting several flesh wounds on his body. He said no one was to blame as it was an accident.

On October 1, 1891, Thomas Lynch, a miner working in the shaft of the Ground Squirrel, Butte, had his shoulder blade broken. Wm. B. O'Mally, Wm. Hudson, and Thomas Lynch were working on the 11 o'clock shift. After having their lunch they were in a hurry to return to the shaft as the weather was very cold. The crosshead was wet and must have frozen to the guides as it stuck on top when the bucket was lowered with the men. They did not notice it. When they were down about 100 feet the crooss head got loose and fell, striking Lynch on the shoulder, and a piece of it struck O'Mally on the head.

Lynch was knocked from the bucket, but he caught on the wallplate of the shaft.

The men on the bucket signaled the engineer to stop, which he did . Then they signalled him to hoist slow. When they got to where Lynch was they took him on thebucket and brought him to the surface.

Lynch owes his life to his endurance and nerve in hanging on the wall plate after having his shoulder blade broken, which was no easy matter. If he had not he would have fallen a distance of about seventy feet and probably would have been killed.

On October 2, 1891, Michael Sepp, a miner employed by the Butte Copper Co., sinking a shaft on the Ground Squirrel, in Butte, received injuries from which he died next day—caused by bucket falling on him, which weighed about 500 pounds. The gallows frame was not covered. A small building that covered the engine and boiler stood some distance north. At the south-east corner in this building was a blacksmith shop. Two or three cans of oil were kept south of the boiler, close enough so that in cold weather it would not get thick. About seven feet north of where the boiler was fired was stored a lot of giant powder and caps. This was about six feet west of where the hoisting engine stood. About 7 p. m. October 2nd the building took fire, at the southwest corner, where the oil was stored. G. H. Smith, engineer on duty, said he attached the hose to the feed pump and turned on the water, but could not get the fire under control. When the fire reached the explosives a terrific explosion occurred, demolishing the shaft house and disabling the machinery so that the bucket, which was hanging in the shaft about eight feet above the bottom, dropped, striking Sepp. The men in the shaft knew nothing of the hoisting works being on fire until they heard the explosion.

As to the quantity of powder stored there at the time, Wm. M. Jack said that on the 28th of September he delivered 300 pounds of powder to the Company, at the hoist. This was in large sticks, intended to be used in holes drilled with the machine. Of course some of this had been used. Besides this there must have been some small sticks that are needed in squaring the shaft, when short holes or plugs, as they are commonly called, are put in with a hand drill. Mr. Smith told some parties on the night the explosion occurred that there were about 600 pounds of powder there at the time, but at the inquest he said there was but 200 pounds. I think, at the lowest estimate, there was from 250 to 300 pounds of powder in the hoist at the time of the fire.

Several dwelling houses close by were damaged and some of the people occupying them injured.

One man's injuries were so serious it was thought doubtful if he would recover.

A lady and her child were also hurt.

J. M. Merrill, foreman of this mine, testified at the inquest that at no time did they keep more powder than was necessary for immediate use, yet he admitted that 300 pounds was there at times. They worked three shifts in sinking this shaft. I

think twenty-five pounds of powder would be a very liberal allowance for twenty-four hours. From the examination that I made and from what I could learn I think the management did not take the proper precaution to guard against accidents. At times during cold weather Mr. Smith would thaw the giant powder by placing about forty sticks of it on the brick wall that was around the boiler. This man knew very little of the danger attached to the thawing of powder to do this in a hoist used as a magazine.

The men in this shaft should have been notified as there was time, in this case, so they could get under the bulkheading in the pump compartment and protect themselves from the flying debris, or bucket, or anything that might fall in the shaft.

There is a general law making it a misdemeanor to keep any more powder stored in such places than is necessary for immediate use. While the jury knew of this law yet, in their verdict, they stated that the fact that the mining operation was only a prospect (as they termed the sinking of this shaft), the management or company should not be held responsible, and were exonerated. I think it just as bad for parties being neglectful when sinking a shaft as where they are working on a larger scale.

This jury goes further and says:

"As a result of our inquiry in this case we find that there is great lack of prudence throughout the whole of this camp in the handling of high explosives, and the jury thinks the death of Michael Sepp should be a warning to mine owners and miners to be more careful in the future.

I do not agree with them in regards to explosives being handled with a lack of prudence, nor does my experience as a miner in Butte, or in going through them making an examination, warrant me to do so. It may be true of some places, but not of the large majority of them. It is a difficult matter for me to understand if there was no neglect on the part of the management of the Butte Copper Company in the death of Michael Sepp. Surely it was through no neglect on his part that the explosion occurred.

There being no blame attached to any one and no lack of prudence, I fail to see where the warning to mine owners and miners come in. The fact that a two compartment shaft, with machinery on it, is termed a "prospect," and it being a prospect he

has the right to turn the shaft house into a magazine, and in case of an explosion to kill persons living in the vicinity or employed by them.

I consider this Company responsible for the death of Michael Sepp, as powder should not be kept in the hoist or around the boiler, nor the oil be kept where it was. It seems to me that the chances of an explosion from fire or other causes are too great.

October 3, 1891, William J. Goyens was killed in the Cleopatra mine, at Lion City, by a fall of rock. He was at work in a stope with Arthur M. Delareo preparing to put in a set of timbers. About 11 p. m. they shoveled the ore and waste back and Goyens measured for the timbers and told his partner that there was hardly room for the cap. He took a pick and started to take out some ground to make more room; was working but a short time when a rock that was but a few feet above his head fell on him. He died about ten minutes later. The stopes in this part of the mine are timbered with sets. The sets are put in when there is room for them. I do not think any one is to blame for this accident.

October 12, 1891, Dominic McElhenny was killed in the Marie mine, near Phillipsburg.

At 2:20 a. m. he was coming up on the bucket from what is called the 400-foot level. When at the 200-foot level he told Lawrence McMahon, the man on the bucket with him, that he was getting dizzy.

McMahon noticed that he was getting pale and caught him with one hand. At the 100-foot level he tried to get a better hold of his arm; he slipped from him and fell down the shaft 300 feet, and was found dead at the 400-foot station.

These two men were at work in a crosscut that was started 1,000 feet east from the shaft. At the time the crosscut was about 318 feet north from where it was broke off from the drift. The only air was that forced in by the compressor. The condition of the air depended on how the compressor was worked. It would take it some time to drive the smoke and foul air out after blasting.

Just before these men went to work, at 11 p. m., the men coming off of shift blasted.

Owen McBride testified at the inquest that McElhenny said on the station, before starting up, that the air slackened off on them and that they were pretty near knocked out, but that they were all right again.

The shaft is an incline, and the bucket seemed to run smooth on the guides. It was the custom when men were going up or down to go slow. I think, from the effects of the powder smoke and bad air, Mc Elhenny fainted, causing him to fall from the bucket.

October 15, 1891, Patrick Adams and Thomas Stewart, in the employ of the Rocky Fork Coal Company, at Red Lodge, were instantly killed by a fall of ground.

At about 5:30 p. m. they were coming up the slope of No. 4 mine, and were up the first lift when the loaded cars passed them at the switch that goes into the entry.

The man on the cars saw them as he was passing, but a short distance farther up the cars came to a stand still. He went back to see what was the matter and found that there was a cave at the switch. The timbers, in coming down, struck the bell rope and rung the bell in the engine room, and the engineer stopped hoisting.

The slope is timbered with long stringers. At this place there were no center posts.

Where they switch into the entry there is a long stringer that supports the end of the timbers that crosses the slope over the switch. This is what broke, letting the top rock, 14x18 feet square and about 20 inches in thickness, down, thereby killing the two men.

The stringers used are quite heavy and strong, but of unusual length, on account of the width of the slope. The timbers were lagged over tight. Persons in going through the slope could not tell the condition of the roof only from the weight the timbers showed.

The Coroners jury returned a verdict that it was an unavoidable accident.

October 31, 1891, Patrick McVarry was seriously injured by a cage running away at the Mountain Consolidated mine in Butte.

When the night men were coming off shift they were all up excepting two men on the 600. Mc Varry, who was station tender, got on the cage at the surface to go back for them.

Richard Bowden was engineer on duty and Patrick Sullivan was attending to the brakes.

Sullivan stated that he was standing about eight or ten feet behind the engineer.

Bowden started to lower the cage with McVarry on it. When down between the five and six hundred he threw the reverse lever over and gave the engine a full head of steam, dropping the cage to the bottom and running off about 100 feet of cable. After the cage struck the bottom and before Sullivan could apply the brakes, McVarry had his left leg broken at the knee, which had to be amputated, and his hand was injured.

I examined the machinery and found it was in good condition.

I dont think an accident of this kind could occur except through the fault and negligence of the engineer, whom I think is to blame for it.

On November 2nd Charles Stoker, a coal miner, was killed by a fall of rock in the Rocky Fork Coal Co's mine at Red Lodge.

The Coroner's jury returned a verdict that the accident occurred through his own carelessness and neglect.

A few minutes past 12 o'clock on the night of November 2, 1891, James O'Donnell, William Martin, Patrick Mulligan, James G. Sullivan, James Roach, Michael McEvoy, Charles M. Evans and Dennis Shaughnessy were instantly killed and John Ritchie received injuries from which he died in a few hours. Jerry Harrington was injured on the legs.

These men were employed by the Anaconda Company and were working on the 900 and 1,000-foot levels of the Anaconda mine at Butte.

They got on the east cage, which is a double deck, in company with some other men, as both decks were loaded with men coming up to lunch. The engineer was signaled to hoist to sur-

face. When between the 300 and 400-foot levels he noticed the cable turn over, and thinking something was wrong he stopped and then started to hoist slowly to the surface.

Ritchie and Harrington were on the lower deck. The men on the cage could not tell just what happened, but that a number of men were thrown from the cage, and that it swayed and jarred before being stopped.

I was at the hoist about one hour after the accident and talked with some of the men who were on the cage at the time. They differed in regards to the number of persons that were on each deck of the cage, and some of them told me they had all they could do to hold on, and knew but little about it.

It was impossible to ascertain how many men were knocked off the cage until the eighth man was brought up from the sump, below the 1,000-foot level.

Ritchie died shortly afterwards from the injuries he sustained.

I examined the shaft from the surface to the 1,000-foot level and the timbers were all in place and had not taken any weight to move them so as to move the guides or interfere with the cage coming up or going down the shaft. When the accident occurred the cage, in coming up, struck the chairs on the north side of the shaft at the 400-foot level and tore them out. About four sets above this the guide on the east side of this compartment was broken between the two center pieces about five feet in length. The chairs in use, excepting the top one, which is a spring chair, are dead chairs, which are moved out and in the shaft with a lever. When in the shaft, and the cage coming up, they are supposed to go out without interfering with the cage. If they were in the shaft at the time some person must have put them in after the cage went down, which I dont think they did. If anything became wrong with the bolts that fastened the chairs to the wall plate the chairs would move out of place and the cage would catch on them coming up and cause the accident, by shaking the cage and knocking the men from it. However, there was nothing that I could find out that would warrant me to take this view of it. There were two men whose duties were to go through the shaft and examine the chairs and guides every morning from five o'clock to seven, and the fact that rock was being hoisted steadily through both compartments of the shaft

until a few minutes before the accident, it seems reasonable that if anything were wrong with the chairs the cage would strike them.

From what I could learn the more probable case was that some one on the upper deck of the cage either fell out or got his shoulder caught against the wall plate, crushing him down between the timbers and the upper deck, and striking those on the lower deck, would be likely to knock them off. Some of these men being caught between the cage and the wall plate would push the cage to the other side of the shaft, and forcing the shoe against the guide, breaking it.

If the same thing occurred at the station below it would, probably, push the bottom deck of the cage far enough north in the shaft to strike the chairs.

I did not find out the exact number of men on the cage as the statements on this was somewhat conflicting.

The foreman and others stated that the rule was that only nine persons should ride on each deck, making eighteen on a cage, yet there were nineteen or twenty on the cage when the accident happened, and among them were some who had never worked much in a mine before and probably knew but little about holding on a cage.

I made a very careful examination, and from the information I received I do not think blame could be attached to anyone for this accident.

November 20, 1891, John Eskolo was killed in the Alta mine, out from Wickes. He had been working three days and was employed as driver, driving a mule that draws the cars out of what is called No. 8 tunnel. Five cars are the usual load. This time Eskolo had four. Brakes are on each car.

There is a door at the mouth of the tunnel. The Superintendent said that he had ordered the drivers to stop the trip at the door and open it, but it seemed to be the custom with the drivers to slacken their pace and climb over the cars to the front one and when near the door get off and open it. The tunnel is very narrow, hardly room for a person to stand between the sets' against the laggin, while the cars are passing.

Eskolo, in getting off or trying to pass the mule must have stepped on the rail and fell. The cars were going and one wheel of the front car passed over him. He died about an hour later.

## REPORTS OF MINES.

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### BEAVERHEAD COUNTY.

The principal mining is being done at Lion City, in the Cleve and Cleopatra mines. At Bannack the Golden Leaf mine is in operation, and placer mining is carried on with very good results. Around Argenta several smaller properties were working a few men.

#### LION CITY.

The Cleve mine, owned by the Hecla Consolidated Mining Company, has been worked at intervals since 1877. Although the incline sunk on the lead is but 400 feet from the surface, with drifts driven and some stoping done. There is not much timbers used in this mine. The ventilation where the men were at work was fairly good.

The Cleopatra mine is owned by the same company. This mine has been worked constantly since 1877 and considerable work done. The main incline is down about 2,400 feet, pitching about 22 degrees. The ore lies in chutes or pockets, varying in height and thickness, in places being fifty feet high and in others running down until the walls cut it out. It is timbered mostly with sets and a number of cribs and long stulls are used. There is a tunnel run in that taps the incline down about 1,800 feet. There is another incline sunk 800 feet below the tunnel, on a chute of ore, where there is some work done. In most parts of the mine the air was good but in places where there was no return it was very bad.

The present system of timbering is much better than the timbering done in the old workings. In these old workings the hanging wall, in places, is good yet, where the chute of ore is large and the amount of waste not sufficient to fill in after the ore is stoped out, there is nothing to secure the ground but long stulls, which are of little or no value in holding the walls in

place. To crib and bulkhead these places will cause a great deal of dangerous and expensive work, and oftentimes it is almost impossible to prevent a cave.

The work being done at present, under the management of S. A. Barbour, is done in good workmanlike manner.

This Company work about 180 men in both their mines and have their ore treated in the smelter at Glendale.

### BANNACK.

The Golden Leaf mine, owned by the Golden Leaf Mining Co., limited, has been worked by this Company for the past eighteen months. There are two tunnels driven in the hill, the principal work being done through the lower one, which is driven in 600 feet, and the chute of ore was cut and some stoping done. Connections were made to the surface by an uprise.

A winze was sunk to the depth of 100 feet, with some drifting done at the bottom. The walls seemed pretty good. Very little timber or waste, to fill with, is used where the ore is taken out. The air in some places was not good, particularly down the winze.

This Company work twenty-five men, and a ten stamp mill is kept going steadily.

John R. Gilbert is Superintendent.

Several mining claims out from Bannack worked a few men, and some were making preparations to work on a larger scale. Among those were the Pomroy, Artic, Delmonte and Kent.

### CASCADE COUNTY.

Coal mining is the principal mining done in this County.

Twelve miles from Great Falls are the Sand Coulee coal mines, which are one of the largest coal mines in the State. The vein that is worked here has been traced for several miles. At Belt and Armington the same vein is worked on a smaller scale.

At Great Falls are located the Boston & Montana smelting plant and the Great Falls smelter.

### SAND COULEE.

The Sand Coulee coal mines are operated by the Sand Coulee Coal Company. H. Burrell, manager.

These mines have been worked for some time and have a large number of entries drove and several rooms are being worked from them.

The mine is worked on the double entry system. The roof or hanging wall is pretty good. Not much timbers used, and those that are used are not heavy. The vein is a flat or blanket vein, the average thickness, including all vein matter, being about eleven feet. About six feet of this is worked and shipped as merchantable coal. This is a lignite coal. Their principal trade at present is supplying the railroad, besides they have a local trade that is steadily on the increase.

When working to their full capacity they produce about 1,400 tons per day. They do not work steadily, and the output for the last year averaged about 800 tons per day, for which the Company had a ready market.

The mine is ventilated by a fan that forces the air in and through the workings. This fan is capable of forcing the required amount of air at the incast, but the workings being very extensive and the distance the air has to travel through the different entries and rooms to the outcast being very long, the loss of air by friction and the brattice in the old break through or crosscuts, between entries and rooms, not being air tight, made quite a loss from the main current. This current was supposed to travel around the face of the workings where the men were at work. The break through between rooms was, in some places, a long way back from the face. The air in some of the rooms was not as good as it should be when I last visited the mine, but they were driving an air course, which would cut off a great deal of the old workings and give a more direct return to the air and increase and strengthen the current, and were making other improvements that would assist in ventilating their mines.

This Company gives employment to 300 men in and around the mine

At Belt and Armington there are a number of coal mines worked on a small scale. The principal work is done during the winter months. They furnish coal to several of the adjacent towns.

### DEER LODGE COUNTY.

Among the mining towns of this County Granite ranks first as a producer, with the Granite Mountain and the Bi-Metallic giving employment to several hundred men around its mines and mills, and several other properties that are being developed. It is making rapid advances to great wealth and has added greatly to the growth of Philipsburg.

Philipsburg has the Hope, the Marie, and the Midnight, and several other claims.

At Champion, the Champion, New State and Mountain Lion are the principal mines.

About nine miles from Philipsburg, at Black Pine, the Combination is working full blast.

Out from Deer Lodge, in the Zosel District, several claims are being worked.

At Elliston the Ontario and others are being developed.

The Bald Butte is also in Deer Lodge County, although situated very near Marysville.

At Anaconda is located the great smelting plant of the Anaconda Company, being the largest of its kind in the United States. When working full force they employ in the neighborhood of 2,000 men.

The Granite Mountain mine, worked by the Granite Mountain Mining and Milling Company. Thomas Weir, superintendent.

The first work done on this property was tunneling in the mountain. There were two tunnels, the farthest up of these being 200 feet above where the present shaft is sunk. The shaft is a three compartment, down 1,578 feet, with levels driven down to the 1,300, and connections made from the 900 to surface. When I went through the mine no stoping was being done below

the 900, or above what is called the 600-foot level. The work being done on the lower levels was drifting and driving uprises. The air in most places above the 900 was good, below the 900 it was not good. The timbering in the shaft from the 600 to surface was badly decayed and the weight of the walls forced them out of place, so that the cages could barely pass, and would almost catch against the wall plate when going up and down the shaft. The levels are timbered with sets. The stopes with sets, half-sets and, in places, stulls are used, and then filled with dirt, making them secure. Large pumps are used for keeping the water out. A 4 1-2x3-8 cable, Corliss hoisting engine (double reel 20x60 inch cylinders.)

The bearing surface of the brakes are not wide enough to do the work required.

Cages always lowered with the brakes and were not run counter balance. There was a continual strain on them and two streams of water were kept running on the bands to keep the wood from burning. When they were hoisting steadily the engine room would be full of smoke from the wood burning, and the heat caused by the friction would be sufficient to expand the iron. The brakes might then be tightened, and, with the water running and not hoisting, in a short time the iron would contract, so that the brake would get loose, and any load on the cage might cause it to start, and if below the 800 loaded I do not think the brakes are sufficient to stop it. I notified the Superintendent to retimber his shaft where needed, from surface to 600, and called his attention to the brakes used daily to lower men to the different parts of the mine. Also to stop his men from riding on the cage with timbers or loaded cars.

This Company employ 320 men under ground. Two mills at Granite, eighty stamps, and a ninety stamp mill at Rumsey are kept going steadily.

S. F. Kyle is under-ground foreman.

This Company is sinking the Cleaveland shaft at the Pewabic mine. It was down 185 feet and well timbered. They were grading for a large hoist and preparing to put in heavy machinery. T. J. Grant is under-ground foreman.

The Bi-Metallic mine, worked by the Bi-Metallic Mining and Milling Company. J. B. Risque, Superintendent.

A three compartment shaft is down 1,000 feet, timbered with 12x12 inch timbers, with stations cut and levels drove and connections made between all levels and surface. The levels are timbered with sets; the stopes are timbered with sets and filled with waste. This mine is well secured and well ventilated.

Knowles' pumps are used for pumping out the water, a 6x1-2 inch cable, 22x60 double cylinder engine with all modern improvements for hoisting.

All machinery in and around the mine is first class and can always be found in good working condition. John Foley is master mechanic and has charge over all machinery.

The Fanny Parnell shaft, No. 4, worked by the same Company, was sunk to the depth of 290 feet, timbered with 10x10 inch timbers, and were to continue sinking.

The Bi-Metallic Company give employment to 135 men under ground and a 100 stamp mill is kept going steadily.

B. B. Thayer, foreman.

The Elizabeth mine. This mine has been worked since 1889 by The Elizabeth Mining Company.

A three compartment shaft was down 470 feet, timbered with 10x10 inch timbers, with a station cut at the 450, and cross-cuts drove north and south, and were drifting on the ledge when I visited the mine. There were no connections made to surface, the only way out being through the main shaft. The ventilation was not good. I notified W. D. Dodds, Superintendent, to provide another outlet from the 450-foot level to surface, that could be traversed.

A Knowles pump is used to keep the water out. A cage, one inch rope and 12x16 double cylinder engine for hoisting purposes. This Company employes fourteen men.

The Bi-Metallic Extension mine. This mine has been worked by the Bi Metallic Extension Mining Company since November 1889.

A two compartment shaft, timbered with 10x10 inch timbers, was down 265 feet. The work being done when I visited the mine was sinking. A Knowles pump was used to keep the water out. A bucket, one inch rope, and 12x16 double cylinder engine for hoisting. Employs nine men. James Patton Superintendent.

East Granite mine. This mine has been worked by the East Granite Mining Company since January, 1891. A two compartment shaft was down 225 feet, timbered with 8x8 inch timbers. Were drifting on the ledge.

A Knowles sinker was used to keep the water out. A bucket, 3-4 inch rope, and small engine for hoisting.

This Company employ twenty men.

John Welsh, Superintendent.

#### PHILIPSBURG.

The Hope mine. This mine is worked by the Hope Mining Company. A two compartment shaft was down 235 feet, timbered with 8x8 timbers. Connections had been made from the upper level to surface, and were working to connect the lower level with the upper, which would make the air good. The levels are timbered with sets, the stopes with sets, half-sets and stulls, and kept well filled with waste. The timbers used are not heavy or very strong. A bucket, 5-8 inch rope and small engine for hoisting. Worked thirty-four men under ground, and the ore is treated at the Hope mill, Philipsburg. J. D. Fletcher has charge of the under ground work.

Marie mine, worked by the Marie Mining Company since last May. A two compartment incline shaft is down 550 feet, timbered with 8x8 inch timbers. Theree stations have been cut, drifts drove, and some stoping done. The only work being done when I went through this mine was, driving a crosscut north from the drift on the 400-foot level. No. 1 level is connected with surface by means of a tunnel. There were no connections between the other levels. On the 400, where the men were at work, compressed air was used. The ground seemed good and in the drifts not many timbers were used.

Knowles' duplex pump was in use to keep the water out. A bucket, one inch rope, and 10x12 double cylinder engine for hoisting. Gives employment to thirteen men around the mine, with Phil M. Sanders as Superintendent.

Midnight mine, worked by the Midnight Mining Company.

The shaft was down 150 feet, with levels at the 50, 100, and 150 feet.

There were no connections between levels and surface and the air was not very good.

The levels are timbered with sets. A bucket, 1-2 inch rope and a whim for hoisting. Work thirty-six men in this mine.

Robert Nelson had charge.

### CHAMPION.

The Champion mine, worked by the Champion Mining and Milling Company for the past four years. E. T. Stoughton, Superintendent.

A two compartment shaft is down 600 feet, timbered from the surface to the 500 with 8x8 inch timbers, from the 500 to the 600 with 10x10 inch timbers.

Levels are driven at the 200, 350, 475 and 600 feet, with connections made between levels from the 475 to surface. The air was not good on the 600.

The levels are timbered with sets, the stopes with stulls and filled with waste. The stulls are long and not of much service, the only support to the wall being the waste, which is good when the stopes are well filled.

No men were at work above the 500, all stoping being done on this level at the time.

Knowles pump was used for keeping out the water. Cage, 1 1-4 inch rope and 12x14 double cylinder engine for hoisting. Employ forty-five men. The ore is treated at the Company's mill at Deer Lodge.

The Combination mine, at Black Pine, is worked by the Combination Mining and Milling Company.

A two compartment shaft is down 200 feet, timbered with 8x8 inch timbers, where the ledge is cut and drifted on. Connections have been made to surface. The timbers mostly used are stulls, and then filled with waste. A bucket and small engine for hoisting.

About 700 feet from this shaft the Company are sinking another shaft. It was down 265 feet. The ledge is cut and a drift driven and some stoping done. The system of timbering the same. Were driving a drift to connect the workings of the two mines. This will make the ventilation very good.

The ledge is almost flat, or what is commonly called a blanket vein. They were preparing to put a large hoisting plant on this shaft. Give employment to eighty men and a twenty stamp mill is kept going steadily.

David Ballantine had charge of the mine.

The Bald Butte mine, worked by the Bald Butte Mining Company, with Thomas Sincox foreman.

This mine has been worked since June, 1890. An incline shaft, shaft 9x4 in the clear, was down 200 feet, pitching at an angle of 50 degrees. The upper part of the shaft, to a depth of 30 feet, is timbered with round poles, similar to heavy lagging. It is what is commonly called cribbing. Below this, 31 feet, hardly any timbers are used. Sets are placed at great distance apart. No girths used. They are not lagged. Most of the timber used is not strong and afford no security to the ground. Very few timbers are used in the stopes. An uprise from the 100 to surface was partly filled with waste and had no ladders. I could not enter it from the level, but from surface could see stulls in places. It was poorly timbered. I notified the foreman to timber the shaft with sets and lag them and to timber stopes and the uprise. Also to put in ladders so the men would have a separate way to get out besides the main shaft.

A bucket, small engine and 7-8 inch rope for hoisting. Blake's sinking pump for keeping the water out. Work twenty miners, and have a twenty stamp mill to treat their ore.

#### FERGUS COUNTY.

The mining being done in this County is around the town of Maiden. The Spotted Horse is working a good force of men, and the She mine and several other claims in this vicinity have been developed on a small scale.

During the past summer considerable coal land has been taken up. About three miles from Maiden some coal mines have

been opened and the coal is found to be of a good quality. They supply the town, the Spotted Horse mine and mill, and the coal gives good satisfaction.

### MAIDEN.

Spotted Horse mine is owned by P. W. McAdow. Has been worked by different parties for the last four years. The first work of development being through a tunnel run in the hill.

A two compartment shaft is sunk to the depth of 260 feet and timbered with 8x8 inch timbers. Three levels have been driven from it and connections made. The air in the lower level was not good. In all other parts of the mine it was good. In the levels and stopes, where timbers are used, sets are put in. The present system of timbering is much better than the timbering done some time ago. In some of the old workings, especially, where the chute of ore was large, stulls were used instead of sets. Much of this work had to be gone over and retimbered.

A Knowles sinking pump, bucket, 7-8 inch rope and small engine are used at this mine. Work twenty men. A twenty stamp mill is kept going constantly on the ore taken out.

The mine has been worked by W. H. Burgess since last May. It is worked through a tunnel run in about 50 feet. From this a winze is sunk on a chute of ore to the depth of 30 feet.

Employ six men.

Mr. Burgess was preparing to start the old Maginess Mill.

### GALLATIN COUNTY.

There are vast beds of bituminous coal in Gallatin County. At present the principal coal mining is done at Timberline and Chestnut.

The Timberline coal is used as fuel on the Northern Pacific Railroad. The Chestnut is worked under lease and supplies a local trade.

Timberline mine, owned by the Northern Pacific Coal Company, is worked under lease by C. W. Hoffman.

When I visited the mine they were not working a full force of men. There are three separate workings. What is called No. 3 is a slope and pitches about 30 degrees. The first lift is down 280 feet. The work being done in this was drawing the pillars and sinking the slope for another lift, which was down 250 feet below the first.

A one inch rope 12x20 double cylinder engine was in use to hoist the cars.

No. 5. A tunnel was run in the hill, where the vein was cut and drifted on.

No. 6. The only work being done in No. 6 was drawing the pillars.

These mines are well timbered and ventilated. The average height of coal is five feet. When the mines are running steadily they give employment to 125 men and ship 5,000 tons of coal per month.

#### JEFFERSON COUNTY.

The principal mining towns of this County are Elkhorn, Wickes, Comet, Basin, Boulder and Placer.

The ore taken from the mines of this County is treated at Toston and East Helena smelters.

They are making preparations to erect a smelting plant at Boulder.

There has been considerable placer mining during the past summer in Jefferson County.

#### ELKHORN.

The Holter mine, owned and operated by The Elkhorn Mining Company, Limited. John W. Plummér, Manager; C. A. Molson, Superintendent.

This mine has been worked about ten years. The Elkhorn Company have been working it since March, 1890. The shaft, sunk on the ledge, is an incline at an angle of about 37 degrees and is down 1,150 feet, with stations cut about 100 feet apart.

The hanging wall is good, and where the ledge formation is taken out there is not many timbers used. In the shaft the first 50 feet is timbered with 12x12 square sets with strong center posts, it being under the foundation of the hoisting engine. In other parts of the mine stulls are used. A double decker skip is used for hoisting purposes, having no safety appliances. The rope is 1 1-4 inches. The engine is 20x60 double cylinder. The air was pretty good, as connnections are made between all levels from the 1,150 to surface. There were but two men employed above the 600. This Company work seventy-six miners and twenty-four men assorting ore in the ore house. A twenty-five stamp mill is kept going on the free milling ore. The lead ore is shipped to the smelters at East Helena.

The C. and D. mine, owned and opperated by the C. and D. Mining Company. Joseph Macdonald, Superintendent.

This Company commenced working this property September 1st, 1890. The ledge is cut with a drift run in the hill about 150 feet from surface. From the drift to surface the ledge is well worked out. The old timbers in the mine are not as substantial as they might be. Stulls were used where sets and lagging would do better service. The timbers being put in at the present time are sets. There is an incline two compartment shaft sunk on the ledge 220 feet below the drift. The shaft is timbered with 8x8 inch timbers. The engine is a 6x8 double cylinder engine. A 3-4 inch rope, with bucket, is used for hoisting purposes. Stations are cut at what is called the 2, 3 and 4. Some stoping has been done from the three up to the two hundred. This mine is well ventilated, except the lower part. The ledge varies in size from four to forty feet. They give employment to about forty men. Their ore is treated at East Helena and Great Falls.

The Union mine. This mine is owned by J. L. Perkins and Daniel McNeil. About 100 feet from surface there is a drift driven in the hillside 420 feet. A vertical shaft is sunk from surface and connects with the drift. This work was done some time ago. At present are sinking a two compartment shaft, timbered with 8x8 inch timbers; is down about twenty feet below where the drift taps the ledge. Ventilation is good. Seven men are employed in this mine.

The Tacoma mine, owned and operated by the Tacoma Mining Company. G. J. Bottcher, Manager.

This Company has been working this mine since April, 1890. The ledge is what is commonly called a blanket ledge. They

have tunneled in the hill on the ledge. At present there are three of these workings. A winze, to connect the upper workings with the lower, was down forty feet. There were no timbers used in the winze, and no way of traveling it except being lowered or hoisted in a bucket, by windlass. At the bottom of the winze, where one man was at work, it was with great difficulty a light of any kind could be made to burn. He requested me to move carefully as the least motion would quench his light.

I also found stulls in parts of the drift where sets and laggin should be used.

I notified Mr. Bottcher to timber his mine properly and to attend to the ventilation, where necessary. Mr. West, the foreman, informed me that they knew how a mine should be timbered and ventilated, but when the air became bad they generally stopped work on it. However I did not agree with him, for if he took into consideration the health or safety of his employes he would timber and ventilate his mine. They worked twenty-two men and shipped their ore to Tacoma smelter, at Tacoma, Washington.

The Grizzly mine, worked by the Grizzly Mining Company. This mine has been worked at different times for the past four years. The present Company have been working it since April, 1891. A two compartment shaft is down 170 feet, pitching at an angle of 70 degrees. The ledge drifted on at the 50, 100 and 150 foot levels, and some stoping done.

The shaft was poorly timbered and the drifts were timbered with sets of small timbers, and where stoping was done a few stulls were used. The air was poor and no connection with surface had been made besides the main shaft. I notified Henry Mounts, foreman, to retimber his mine and provide another outlet that could be traversed by the men.

A Knowles sinker was used for pumping the water. A bucket, 5-8 inch rope and small engine for hoisting. Employ ten men.

#### WICKES.

The Alta mine, worked by the Helena and Livingston Reduction Company. S. D. Davis, Superintendent.

The principal work done on this property is through tunnels. Five of them have been driven in the hill and the fifth is

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called the 800 foot level. From the 800 a three compartment incline shaft is down 235 feet, timbered with 12x12 inch timbers, and levels driven. Connections have been made from the 900 to surface. The lower level had not been connected with the 900 at the time I visited it, and the air was not good there. Above the 900 it was good.

The tunnels and drifts are timbered with sets, and the stopes with posts and stringers and filled with waste.

The old workings were poorly timbered and not well secured.

The timbering being done at present in this mine is good.

This Company employ 140 men. The ore is concentrated at Corbin and then treated at East Helena smelter.

The Josephine mine. This mine has been worked for the past six months by Hersey & Bean.

A two compartment shaft, timbered with 8x8 timbers, is down 120 feet.

A tunnel run in the hill connects with the shaft at the depth of seventy feet. Some drifting had been done from this tunnel. Sinking was in progress when I visited this property. Gives employment to twelve men. D. S. Smith had charge of the works.

The Pen Yan mine. This property is worked by the Pen Yan Mining Company.

A two compartment shaft is down 200 feet. The ledge is drifted on at the 80, 140, and 190 foot. Some stoping had been done on the 80-foot level.

The 140-foot level is connected with the workings of the Blue Bird mine.

They were drifting on the ledge at 190-foot level. A Knowles sinking pump used to keep the water out. A bucket, 3-4 inch rope and small engine for hoisting. Work twelve men around the mine.

W. L. Lee is Superintendent.

## COMET.

Comet mine, worked under lease by Murray & Co.

The shaft is down 500 feet, timbered with 12x12 inch timbers. Some time ago work was abandoned on this property and the shaft allowed to fill with water. Some of the old workings in this mine were not properly timbered, and after work was suspended it closed in. The water has been pumped out down to the 300-foot level.

They were crosscutting on the 300 and some men were working on the surface of the ledge taking out ore.

A Knowles sinking pump was in use to keep the water out. A cage, 3 1-2x1-2 inch cable and 16x36 double cylinder engine for hoisting.

Employ twenty-three men and the ore is treated at the East Helena smelter.

East Rumley mine. This property is worked by A. M. Holter and Bro.

A two compartment shaft is down 297 feet, with two levels driven.

Work on the upper level is abandoned and all the stoping being done on No. 2, and had started to crosscut on No. 3. Connections had been made from No. 2 to surface but it was filled with waste and could not be traversed. Consequently there being no return for the air it was very poor, especially in stopes where men were at work it was with difficulty that a candle would burn.

There is not much timber used in the mine, and in the stopes the waste was not sufficient to keep them filled as they should be where timbers are not used. In the manways from the drifts, up to the stopes, there were no ladders in places and the men were obliged to climb up on the cribbing. Parts of the drifts were timbered with long stulls, which were too long to be of much service. A bucket, 5-8 inch rope and small engine for hoisting.

Work thirty-two men around the mine and the ore is treated at East Helena smelter.

I notified Superintendent A. P. Loberg to provide another outlet that could be traversed and to put ladders in the manways. Also to timber the mine properly.

Boulder Chief mine, worked by the Cataract Mining Company. Wm. B. Thomson, Superintendent.

A two compartment shaft is down 350 feet, with levels at 150, 250, 300 and 350-foot. There were no connections from 250-foot level to surface, but the 250 was connected with the 300. The air was not very good.

When timbers were used on the levels sets were put in. In the stopes and upraise stulls were used. Were not doing any work below the 300 when I went through the mine.

Knowles sinker and station pump were used to keep the water out. A bucket, 3-4 inch rope and 7x10 double cylinder engine for hoisting.

Gives employment to fourteen men and the ore is treated at East Helena. I notified the Superintendent to repair the timbers in the upper part of the shaft and to put a cage in, also to make connections between the 250 and surface.

The Copper Bell mine, worked by the Copper Bell Mining Company since June, 1890.

A two compartment shaft is sunk to the depth of 375 feet, with levels driven about 100 feet apart. Connections were made from No. 3 level to surface. No connections had been made from No. 4 to No. 3. The levels are timbered with sets and the stopes with stulls.

The lagging in the lower part of the shaft was broken in places. There were no ladders in the uprises and they were partly filled with waste, so they could not be traversed.

The air in the lower level was not good. A Knowles pump for pumping out the water, and a bucket, 3-4 inch rope and 6x8 double cylinder engine for hoisting purposes.

Work thirteen men around the mine, with S. B. Corneck in charge.

I notified this Company to repair the shaft and to replace the bucket with a cage. Also to clean out the uprises and put ladders in them so they could be traversed by persons working in the mine.

White Pine mine, worked by the Wisconsin Mining Company. Peter Olson, foreman.

A two compartment shaft sunk to a depth of 330 feet, timbered with 8x8 inch timbers, with levels at the 120, 227 and 330 foot. No connections had been made between the levels, and the only way out being through the main shaft. The air was not good. The levels are timbered with sets. The only work being done was drifting on the lower levels.

A Cameron sinking pump, bucket, 3-4 inch rope and 8x10 double cylinder engine were in use at this mine.

I notified the foreman to put a cage in the shaft, also to make connections between the different levels to surface. Ventilation would be better and in case of fire the men working in the mine would have a way to escape otherwise than through the shaft.

This Company is sinking a two compartment shaft on the Manchester mining claim. It was down 65 feet.

Employ twenty men.

#### BASIN.

The Hope mine, worked under lease and bond.

A two compartment shaft was sunk some distance before the present parties commenced work on it. The work being done when I visited the mine was sinking.

The only timbers put in were a few stulls that were of little service.

The sinking pump and pipe was hung on a couple of stulls that were put in without head boards. and the ground was not secured. I notified William Kitto, who had charge of the work, to timber the shaft with sets and lag them, so as to prevent any loose ground from falling on persons at work in the shaft. Also to fasten the pump on with the hangers. They employed eight men.

#### PLACER.

The East Pacific mine, worked by the East Pacific Mining Company.

There are three tunnels driven in the hill, the upper one being in about 1,437 feet. Two hundred feet below this there is another in about 1,630 feet; 270 feet farther down is the lower tunnel, and is in 1,198 feet. An intermediate level is driven between the first two tunnels and connections made. The lower tunnel is not connected with the upper workings. When I went through the mine the ventilation, in most places where men were at work, was good with a few exceptions.

Levels are timbered with sets. The timbers used are not heavy. The stopes are kept pretty well filled with waste, and the only timbers put in them were sprags. This Company work eighty men, and the ore is treated at Aurora, Ill. W. S. Dodge is Superintendent.

The H and H mine, worked by the Custer Mining Syndicate. This property has been worked about four years. A tunnel is run in the hill above where the shaft is sunk. The shaft is a two compartment, down 280 feet, timbered with 8x8 inch timbers, with levels driven and connections made from the 170 to surface. The air was good excepting in a few places.

The levels are timbered with sets. Not much timber used in the stopes. The waste keeps them pretty well filled.

A Knowles sinker for keeping out the water. A cage, 7-8 inch rope, and 12x16 double cylinder engine for hoisting. Employs about forty-two men. The ore is treated at Toston.

O. A. Tibbetts is Superintendent.

#### LEWIS AND CLARKE COUNTY.

In this County, around and in the vicinity of Marysville and Empire are the largest quartz mines that have been worked during the past year.

At Marysville is the famous Drum Lummon, giving employment to hundreds of men in its mine and mills.

At Empire, the Empire is worked full blast by the Golden Leaf Company.

Besides these several other properties are being worked in different parts of the County with very encouraging results and adds to the large production of bullion from Lewis and Clarke,

At East Helena is located a large smelting plant that gives employment to a large force of men.

Helena being centrally located and having excellent railroad facilities, it receives large shipments of ore from the mines of Jefferson and other Counties.

Placer mining still continues during the summer.

### MARYSVILLE.

Drum Lummon mine, operated by The Montana Company (Limited.)

This property has been worked for a number of years, the first work being done through tunnels. About 900 feet in the lower tunnel, which is called the 400-foot level, an incline shaft pitching at 70 degrees, is sunk to the depth of 1,400 feet, with stations cut and drifts driven at the 500, 600, 700, 800, 1,000, 1,200, and 1,400 feet.

About 700 feet south of this is shaft No. 2, sunk to the depth of 1,200 feet, with levels at the same distance apart as in No. 1. These two shafts are connected by drifts on the 600 and 1,000-foot levels.

The air in some parts of the mine was not very good.

Where timbers are used in the levels sets are put in. In the stopes stulls are principally used, then filled with waste.

At No. 1 shaft cages and 20x30 double cylinder engine, and at No. 2 shaft cages and 10x12 double cylinder engine for hoisting.

This Company give employment to 165 men around the mine and 120 stamps are kept going steadily on the ore taken from this mine.

R. T. Bayliss, Manager.

North Drum Lummon mine, worked by the North Drum Lummon Mining Company.

The shaft is sunk to the depth of 120 feet and well timbered. Were crosscutting for the ledge.

A bucket, 1-2 inch rope and whim for hoisting purposes. Employ eleven men, with John Gleason foreman.

### EMPIRE.

Empire mine, operated by the Golden Leaf Mining Company.

Work was resumed on this property about a year ago and has been working continuously since then. The principal work is done through a tunnel called the 500-foot level. About 180 feet above this is the next level. There are two others, about sixty and eighty feet apart, that connects with surface.

The air was good, excepting in two places where men were at work. The old workings are poorly timbered with stulls. They were not put in with the pitch of the ground, consequently would be of little service if any weight came on them.

The walls are good. The timbering done since this mine resumed work is better, that is where timbers are used. Employ sixty men and a sixty stamp mill is kept going constantly on the ore produced by this mine. J. H. Longmaid, Superintendent.

### MEAGHER COUNTY

Is fast developing into one of the leading mining Counties of the State.

As yet they have poor railroad facilities, requiring vast expense in transporting ore by wagon for several miles and in receiving the necessary machinery, etc., to carry on mining properly. Almost every point of the surrounding range have been visited by the prospector and the result is some promising mining districts have been discovered, among which are Castle, Barker, Neihart, Smith's Camp, Robinson and several others.

In many cases the ore, after the expense of transportation, net the owners good profits.

Placer mining is still carried on at Diamond and other parts of the County.

Its but a question of a short time when capitalists will find it more than a paying investment to build railroads to the different mining towns of this County.

### BARKER.

The work of developing the mines of Barker is being pushed with rapidity, giving employment to a large number of men.

### NEIHART.

There has been considerable life in mining in this district during the past nine months. When I visited the mines of Neihart and Snow Creek the following mines were doing development work, and some ore had been shipped, but owing to the difficulties encountered in hauling the ore a distance of thirteen miles to the railroad terminus at Monarch, a number of property owners were waiting for the extension of the road to Neihart before taking out a great amount of ore.

The Monarch mine, owned by the Monarch Mining Company, has been in operation about two years. A drift has been driven in on the ledge about 1,500 feet. The work being done when I visited the mine was the sinking of a two compartment shaft, 7x4 in clear. It was down 60 feet from the bottom of the drift, and was in the drift about 250 feet.

There was but one outlet, that being through the drift. I notified Manager Wm. J. Clark to provide another outlet. He said he would make connections with the uprise that was started from the drift over the shaft.

The ventilation was poor. What air there was where the men were at work was forced through pipes with a small fan run by water power. The timbers used are not heavy. This Company work ten men, and ship their ore to the Great Falls smelter.

Florence mine, Florence and M. & I mining claims. Owned by the Florence Mining Company. G. L. Johnston, Superintendent.

This mine has been worked by the present Company for the past eighteen months. There was some work done before this Company took possession of this property. There is a drift in 420 feet. In this drift a winze was sunk sixty-five feet, but at

present not worked. Some stoping has been done, and an uprise of fifty feet connected to surface by drift. Not much timber used where the ledge is stopeed out as it is filled with waste. They were timbering the lower drift with sets. They employ six men and have their ore treated at Great Falls.

Queen of the Hill mine, owned by the Queen of the Hill Mining Company. Development began on this mine about eight years ago. The present Company commenced work on the 13th of October, 1890. There is a drift driven in on the ledge about 895 feet. Chutes started and ready for stoping. One hundred feet above the lower one there is another drift and connections made from the lower to the entrance of the upper. They started working an uprise 500 feet in lower drift to connect with upper, which will give a return to the air and make the ventilation of the mine much better. It is well timbered, the drifts with sets and the stopes with stulls, filled with waste. They work twelve men and have their ore treated at Great Falls.

C. L. Parker, Superintendent; Rene Curin, Foreman.

Moulton mine, owned and operated by the Diamond R. Mining Company. This mine has been worked about two years. A one compartment shaft down 140 feet. The ledge was cut and drifts drove and some stoping done. These old workings have been abandoned. They are sinking a three compartment shaft, 17x4 feet in clear. It was down 155 feet and was well timbered with 10x10 inch timbers. A small engine and bucket were used for hoisting. They were making preparations for a large hoisting plant and heavy machinery. About thirty-five men were employed in all. R. M. Raymond, Superintendent.

W. H. Banks had charge of the underground works.

Ingersoll mine, owned by the Ingersoll Mining Company. The first work of developing this mine commenced three years ago, the present Company having been working it for the past two years. There is a drift driven on the ledge about 1,100 feet; seventy-five feet of crosscut from the end of the drift, and were to continue work on it. Four hundred feet in the drift there was an uprise of 112 feet, which connected with a drift to surface. There was not any ladders in the uprise and it could not be traveled. The face of the crosscut, where the men were at work, was about 775 feet ahead of the air. The only air was the compressed air that had been used to run the drifting machine. It was not sufficient to carry off the damp and powder smoke. When men went in and started to work they were overcome by

the foul air, at different times, and had to be carried out unconscious. This could be prevented, and with but little expense to the Company, by means of pipes laid into the face of the drift, where the men were at work, and with a small fan air enough to supply the men could be forced through the pipes. The power furnished to run the compressor was more than ample to run both fan and compressor.

I notified them to put ladders in the uprise and to attend to the ventilation, as the health and safety of the employes depended on it.

Sets of small timbers are used in the drifts where the ground is not good. Employ ten men in all.

Glen Owen had charge of the under-ground work, but in justice to him I would say it is not his fault, but those higher in authority.

Dakota mine, owned by the Neihart Mining Company. This property has been worked at intervals for several years. Has been worked continuously for the past year. Work done on this mine consists of tunneling and driving drifts. The principal work is crosscutting for the ledge. The rock is hard and requires but little timbering. The mine is ventilated with small fan. Six men are employed. A. Lambert, Superintendent. D. J. Douglas is in charge of under-ground works.

On the other side of the range, at the head of Snow Creek, a number of men have been employed during the summer.

The Benton group of mines, owned by The Montana Mining Company. D. L. S. Barker Superintendent.

The work of developing these mines has been in progress for the past year. A tunnel, crosscutting the formation, is in about 500 feet. They have drifted some distance north and south. In the south drift there is a winze sunk forty feet on the ledge formation. The timbers used are too small to be of much service. There was but one way of egress through the mine, that being through the main crosscut. The ventilation was poor. Owing to the foul air there was no place in the mine suitable for a man to work. I notified W. H. Chisholm, foreman, to provide another outlet that could be traversed by men employed in the mine, and to attend to the ventilating of the same. This Company employ about twenty men

Cornucopia group, owned by the Cornucopia Mining Company. Col. W. T. Hart, Manager.

This Company has been developing this property since March, 1891. They have tunneled in the hill at three different points and cut the ledges and drifted on them.

They are sinking a two compartment shaft, timbered with 8x8 inch timbers. When down to the 300-foot station the ledge will be crosscutted and drifted on.

This Company spare no expense in providing first class material and good machinery. Everything is done in good workmanlike manner. About thirty-five men are daily employed, with M. C. Duffy in charge of the under-ground work.

The I. X. L. Company were working a few men on their group of mines lower down on Snow Creek.

Outside of the mines I have briefly referred to in this report there was a number of men working around Neihart developing their mining claims and doing assessment work, which will in time add greatly to the output of the camp.

## CASTLE.

Cumberland mine, worked by the Cumberland Mining Company. A three compartment shaft is down 300 feet, timbered with 12x12 inch timbers. Where the station is cut crosscuts and drifts are driven and stoping out the ore is in progress.

Connections have been made to the old shaft, which was sunk to the depth of 500 feet, further up on the hill. This mine is very well timbered and the chute of ore is several setts wide. The air in all parts of this mine, with few exceptions, was good. A large Knowles pump at the bottom of the shaft keeps out the water. A 4 1-2x1-2 inch cable and 16x48 double cylinder engine for hoisting. This mine gives employment to seventy men, and the ore is treated at the Cumberland smelter. Bernard McDonald has charge of the works.

The Yellowstone mine, worked by the Yellowstone Mining and Smelting Company.

A two compartment shaft down 325 feet, with levels at the 100, 200 and 310. The 200-foot level was connected with surface

by an uprise but could not be traversed as the ladders were not connected in some places. The 310-foot level was not connected with 200, "as yet," and the air was not very good in this lower level. The shaft, from surface to the 200, was poorly timbered. The drifts were timbered with sets and the stopes with sets and stulls. Knowles sinker and station pump for keeping out the water. A bucket, 5-8 inch rope and 6x8 double cylinder engine for hoisting.

I notified W. J. Tredennick, who had charge of the mine, to repair the shaft from the 200 up, and put ladders in the uprise so they could be traversed, and also to use cage for hoisting instead of bucket.

They employ eighteen men and the ore is treated at the Yellowstone smelter.

The Armeda mine, worked by the Armeda Mining Company. A small two compartment shaft was down 120 feet. A sinking pump is used to keep out water. A bucket, 3-4 inch rope, and small engine for hoisting. Work six men.

#### ROBINSON.

The Iron Chief mine, worked by the Iron Chief Mining Company.

Work commenced on this mine in September, 1890. A two compartment shaft was down 270 feet, timbered with 10x10 inch timbers. Levels were driven at the 100 and 200-foot. The only work being done when I visited the mine was sinking the shaft. A Knowles sinker pumped the water to the 200 station and a pump on this level pumped it to surface.

A bucket, 5-8 inch rope and 7x10 double cylinder engine for hoisting. Work about fifteen men. E. C. Albrecht was in charge of the works.

#### MADISON COUNTY.

At Pony, Sheridan and Silver Star a number of quartz mines have been in operation during the past year.

In other parts of this County miners were doing representing work and developing their claims.

Placer mining, owing to the wet spring and summer, was carried on quite extensively.

### MISSOULA COUNTY.

Mining in this County has been carried on more extensively during the past year than any previous year.

The Curlew mine, located up in the Bitter Root Valley, is being worked on a large scale. Several other claims in this vicinity are worked.

The Iron Mountain and Little Anaconda are working a full force of men. Also the mines of Spring Gulch.

In other parts of this County quartz and placer mining is carried on.

In the Flathead country a lot of coal land has been taken up and the quality of the coal is pronounced good, which indicates that Missoula County is coming to the front as a mining County.

The Curlew mine, situated near Victor, is worked by the Helena and Victor Mining Company, with George O. Kilbourne Superintendent.

Although work commenced on this property about four years ago it had not been worked on a large scale until the past year. A two compartment shaft, timbered with 10x10 inch timbers, was down 330 feet, and were to continue sinking. Levels are driven at the 100, 150, 200 and 300-foot and connections made to surface. The air is good.

On the 150, in the stopes, stulls are used. Spuare sets are used in all other parts of this mine. The hanging wall is heavy and the old timbering is not strong. The timbering being done at present is very good.

A Dean sinking pump is used to keep the water out. A cage, one inch rope, and 14x18 double cylinder engine for hoisting. Employ seventy men.

A concentrator, with a capacity of 125 tons per day, is kept going steadily at the mine. The ore is then sent to East Helena for treatment.

Iron Mountain mine. This property has been worked by the Iron Mountain Mining Company for the past three years.

Four tunnels have been run in the hill. All the work at present is done through the lower tunnel. The air was fairly good. Connections had been made between the different workings by uprises. As yet there are not many timbers used in this mine. In the tunnels, where any timbers are used, sets are put in and stulls are used in the stopes and then filled with waste.

This Company has built a concentrator about one mile below the mine with a capacity of fifty tons per day. The ore is concentrated here and then treated at East Helena smelter.

Employ twenty-five men at the mine, with A. M. Forbis as Superintendent.

Little Anaconda mine is situated between Deep Creek and Spring Gulch. It has been operated by the Little Anaconda Mining Company for the past year.

A tunnel is run in the hill, where the chute of ore is cut and drifted on. An uprise driven to surface, and stoping was in progress.

The air was fairly good. The drifts are timbered with sets and stulls are used in the stopes.

Employ eighteen men. C. B. Phillips had charge of the works.

#### SPRING GULCH.

Keystone mine has been worked by the K. and K. Mining Company since June, 1891.

This mine is worked through a tunnel driven in the hill. The chute of ore is cut and drifted on. An uprise connects the tunnel with surface. Were working several stopes and sinking a winze on the ore chute, which was down thirty-five feet. The air was good. Stulls are used in the stopes and cap and post in the drifts. Work twenty-eight men and have their ore treated at East Helena.

John Cromie is Superintendent.

The O. R. and N. mine, worked by the O. R. and N. Mining Company.

The old workings in this mine have been abandoned. The only work being done when I visited it was drifting from the lower tunnel. This tunnel is well timbered with sets. There were no timbers used in the drift. The air was not good. Employ seven men. Peter Mack had charge of the mine.

### PARK COUNTY.

Park County has vast beds of coal that are being extensively developed, and coal produced by its mines figures largely as a fuel supply in the State.

At Red Lodge is located one of the largest coal mines of Montana.

At Cokedale and Horr the coal is of a good coking quality. Besides the large amount of coke sent from these places they also ship lump coal.

In Cooke City there are a few quartz claims being developed.

### RED LODGE.

Rocky Fork Coal Company's mines. J. M. Fox, Manager.

No. 2 and No. 6 mines are worked through tunnels. No. 4 mine is a slope sunk on the vein with a pitch of about 20 degrees. The workings are very extensive, a large number of entries driven and several rooms worked from them.

The vein varies in thickness. In places it is twelve feet, or probably more, averaging about six feet of merchantable lignite coal. When working to their full capacity they produce from 1,200 to 1,400 tons per day, but do not work steadily. The daily output during the past year was about 800 tons per day. These mines are worked on the double entry system, and each mine is ventilated by a fan.

The air in most all parts of this mine was fairly good, excepting in a few places. The crosscuts through the pillars between some of the rooms were too far back and the current of air did not reach the face where the men were at work, and the brattice in

some of the old crosscuts between the entries were not air tight, allowing a waste from the main current of air. The foreman said he would remedy this. The vein pitches about 19 degrees, and owing to the vast amount of powder used in breaking the coal, it requires a large amount of air to make ventilation good in these mines.

In No. 4 mine the slope is timbered with long stringers and posts. In these mines, in parts of the entries, posts and caps are put in. Props or stulls are used in the rooms.

A gravity haulage machine lets down the loaded car and draws the entry one up in the rooms.

One and one-quarter inch rope, and 24x40 double cylinder engine are used to pull the cars out of the slope.

This Company employs 400 men around their mines.

J. M. Green, Superintendent.

#### COKEDALE.

##### Livingston Coal and Coke Company.

No. 1 is a drift driven in on the vein. A slope pitching at an angle of 40 degrees is sunk to the depth of 600 feet, with two lifts driven, called No. 2 and 3. They are all connected, the system being to drive an air course over and with the entry. This mine is ventilated by a fan. When I first visited it there were several rooms and some of the entries in which the air was not good. Since then they have made some improvements, and when I last went through the mine I found the air fairly good. The slope is timbered with sets and the entries are mostly timbered with the same. Props or stulls are used to timber the rooms.

This is a bituminous vein of coal that varies in thickness from one to five feet. When free from dirt makes a very good coking coal.

A Knowles pump on the bottom lift keeps the water out. A one inch smooth rope, 24x40 double cylinder engine for hoisting the cars.

This Company have 100 coking ovens, which are kept going making coke. Besides the coke they also ship coal. Gives employment to 200 men in the mine and at the coke ovens.

George T. Wickes, Superintendent.

## HORR.

### The Park Coal and Coke mines.

There has been considerable work done here by tunneling in the hill. The mine worked at the present time is the farthest up on the hill and the sixth opening of this kind, which is a drift or entry run in on the vein. The vein is almost flat and about five feet thick. The coal is a bituminous, of a good coking quality. This mine was opened on the single entry system. The entries and some of the rooms were a long ways ahead of the air. There being no return for it there could be no circulation of air. Canvas was used to divide the entry and give a return to the air, but was of little service. This was when I first visited the mine. I visited it again, thirty days later, and while there was quite an improvement in it, it was by no means good, particularly on what is called the raise entry. In some rooms where men were at work a lamp would scarcely burn.

The Manager agreed to stop a few of the rooms where the air was very bad until he got the air course, which they were driving along the entry, up so he could furnish the men working in them with air.

Props are the kind of timbers mostly in use. In places in the entry, where required, posts and cap were put in. Forty coke ovens are kept going and they ship some lump coal. Employ 100 men.

W. P. Rhoades, Manager.

## SILVER BOW COUNTY.

So rapid has been the development of the mines in this County for the past ten years and the vast output of ore from so many large properties, ranks it foremost among the richest mining districts of the world.

Several of the smaller properties have been purchased by capitalists during the past year and the work of developing commenced.

The Anaconda, St. Lawrence, Parrot, Colusa, Gagnon, Original, Silver Bow Mine No. 1, and No. 2, and several smaller properties are located in Butte.

The Alice, Moulton, Blue Wing, Lexington, Bell of Butte, Grey Rock, East Grey Rock, Magna Charta and Black Rock, are in and around Walkerville, formerly a suburb of Butte but during the past year incorporated as the City of Walkerville.

Burlington has the Blue Bird, Nettie and several other mines.

At Rocker is located the Blue Bird mill.

Meaderville, a suburb of Butte, has the East Colusa, West Colusa, and several of the large smelters.

In Centerville the High Ore, Mountain View, and Mountain Consolidate are situated.

About 4,500 men are employed in the mines of Silver Bow County.

The following properties are owned and worked by the Boston and Montana Consolidated Copper and Silver Mining Company, with Thomas Couch as Manager:

The Mountain View has been worked for about four years. A three compartment shaft down 1,000 feet, timbered with 10x10 inch timbers, with stations cut and the ledge crosscut and drifted on. Connections are made on the north ledge to surface and on the south ledge from the 900 to surface. The levels are timbered with sets and the stopes with the same and filled with waste. This mine is well timbered and ventilated, all timbers used being square. The ledges are several sets wide, and stopping out ore is going on steadily. Pumps on the 1,000, 800 and 400 for coping with the water. Cages, 4 1-2x1-2 inch cable and double cylinder engine 18x48 for hoisting.

The Harris and Lloyd tunnel. The shaft, a three compartment, is down 400 feet, timbered with 12x12 inch timbers. Stations are cut, crosscuts driven, and the ledge drifted on.

The same system of timbering as in the Mountain View is used in the levels and stopes. As the stopes are worked they are filled with waste. The mine is very well secured and the ventilation good. Connections have been made from the 300 to surface.

The ledge is about thirty feet wide. A sinking and station pump for handling the water. A double cylinder engine, 19x48, and a 4 1-2x 1-2 inch cable for hoisting.

The Moose mine. A three compartment shaft sunk to the depth of 300 feet, with stations 100 feet apart. The crosscuts and drifts are timbered with sets, the stopes with half sets and stulls and then filled with waste. When I visited the mine there was no work being done below the 100-foot level. In some places where men were at work the air was bad. In this mine a bucket, 3-4 inch rope and 8-10 doublecylinder engine are used.

The East Colusa. A three compartment shaft is down 800 feet and timbered with 10x10 inch timbers. Below the 500 is filled with water. All work is being done above the 500. Men were working on the 400 and 500-foot levels. Square sets of timbers are used, and the stopes are kept filled with waste. Notwithstanding the fact that the ground is very heavy it is well secured, and ventilation is pretty good. There is a connection made to surface and the 400-foot level is connected with the West Colusa at the 500-foot level.

A large Knowles pump on the 500 keeps the water out. A one inch rope and 14x18 double cylinder engine for hoisting.

The West Colusa mine. A three compartment shaft sunk to the depth of 500 feet, and is timbered with 8x8 inch timbers to the 200-foot level; from there to bottom with 10x10 inch timbers. The ledge is crosscutted and drifted on and stoping out ore is in progress. The system of timbering and the hoisting machinery are the same as on the East Colusa. Connections have been made to surface.

The Lonard shaft is a three compartment, 19x4 1-2 feet, timbered with 12x12 inch timbers. Was sunk to the depth of 600 feet. Connections were made on the 500 with the East and West Colusa. All ore from these mines will be hoisted through this shaft and the water drawn from them and pumped through this shaft. It is the intention to put large pumping machinery and hoisting plant on it, the engine to be the same kind as the one used by the Company at the Harris and Lloyd tunnel.

This Company employ 430 men under ground. The ore taken from their different mines is treated at their plant in Meaderville.

Richard Dawe is the foreman of the Mountain View, Lloyd Tunnel and Moose, and Josia Gilbert fills a like position on the other mines.

The Parrot, worked by the Parrot Company, with B. W. Tibbey, Superintendent.

This mine has been worked continuously since May, 1881. A three compartment shaft is down 700 feet, with stations cut. A large force of men were working in the stopes, which are timbered with sets and then filled. The drifts are timbered with sets. There are two ledges being worked. The shaft cuts the north ledge at the 500. The ledges are wide and some of the ground is very heavy. This mine is well timbered, and there is no better ventilated mine in the State. The water is pumped from the bottom to the 400 and from there to surface. A 20x60 double cylinder engine, with 5 1-2x1-2 inch cable, and all modern improvements for hoisting.

Matt Hodge is under-ground foreman.

The Moscow mine. The Parrot Company took charge of this mine July, 1890, under bond, but since then purchased it, and are making preparation to work it on a large scale. A two compartment shaft was down 200 feet, with some drifting and stoping done. When I visited it a Knowles sinking pump was in use. A small engine, bucket, and 3-4 inch rope for hoisting.

J. R. Evans, Foreman.

This Company employ 180 men under ground, and the ore taken from their mines is treated at the Parrot smelter.

Virginius, worked under lease by David Bricker. A two compartment shaft is down 256 feet, timbered with 10x10 inch timbers, with a station at the 185-foot and another at the bottom. Crosscuts and drifts are timbered with sets. The stopes are timbered with sets and filled with waste.

There were no connections made to surface and the air was not good. I spoke to Thomas Conelly, the foreman, about making connections and have the mine better ventilated. On this property there is a bucket, 3-4 inch rope, 8x10 double cylinder engine for hoisting. Work twenty-four men, and the ore is treated at the Parrot smelter.

The Moulton mine, owned and operated by the Moulton Mining and Milling Company. This mine has been worked for the past twelve years and still continues to be a large producer. A three compartment shaft is sunk to the 700-foot level, with stations cut every 100 feet and connections made to surface.

Five different ledges have been worked. They have been crosscutted and drifted and are being stoped out. The crosscuts and drifts are timbered with sets and the stopes are timbered with stulls and filled with waste. When I visited the mine the principal work was stoping on the 300-foot level. Since then sinking for the 900-foot level has been in progress. The mine is well-timbered and ventilation is good. A cage, one inch rope and large engine are used for hoisting purposes.

A Cornish pump is used to keep the water out. Work about twenty-five men under ground, and a sixty stamp mill is kept going constantly.

This property is under the management of Joseph K. Clark.

The Black Rock mine, owned by the Black Rock Mining Company. R. G. Brown, Superintendent. Thomas Kilgallon, Foreman.

A two compartment shaft is sunk to the depth of 450 feet. From the 200 down is timbered with 12x12 inch timbers, from the 200 to the 100 by 10x10 inch timbers, from the 100 to surface by 8x8 inch timbers. Stations are cut every fifty feet below the 200 and above the 200 every 100 feet. Crosscutting north they cut the ledge, which, in places, is six sets wide. As the ground is worked out the drifts and crosscuts are timbered with sets and the stopes are filled in with waste, affording good support to the timbers. The walls are a kind of swelling ground, which requires good timbering and filling in to keep them in place. Connections are made between all levels, from the 400, to surface, making ventilation good. Most of the work of stoping is on what is called the 300 and 450 levels. The work in bottom was cross-cutting for the ledge. A 10x12 double cylinder engine, cage and 7-8 inch rope were used for hoisting purposes.

Knowles sinking pump is used to pump water from the bottom to a tank on the 400-foot level. Taken from there to surface by station pump. This mine has been operating about three years and employ forty-eight men. The ore is shipped to the Butte reduction works and the Moulton mill.

The Original mine, owned and operated by the Original Mining Company. This mine has been worked for the past fifteen years. An incline shaft sunk to the depth of 700 feet, with stations cut every 100 feet. The shaft is timbered with 8x8 and 10x10 inch timbers. The ledge cut and drifted on. The drifts are

timbered with sets. The stopes with sets and stulls. As the stopes are worked out they are filled with waste. Connections are made to surface. A Knowles pump at the 700 sends the water to a tank on the 400. The station pump there throws it to surface. The engine is a 10x12 double cylinder, a skip, and one inch rope for hoisting purposes. This mine is very well ventilated and secured. Gives employment to sixteen men, and has the ore treated at the Butte Reduction Works. Thomas Bryant has charge of the under-ground works.

The Colusa Parrot, owned and operated by the Clark Bros. This mine has been worked continuously for the past eighteen months. The shaft is a three compartment, down to the 300, from there to the 600 it is a two compartment. Timbered with 10x10 inch timbers.

Stations are cut about every 100 feet. The drifts are timbered with sets of round timbers. The stopes are timbered with the same and filled with waste. The ledge in places is five and six posts wide. Connections are made from the 550 to the 400 and from the 200 to surface. Other connections were to be made in a short time. This mine is fairly well ventilated and well timbered. The engine is a 10x12 double cylinder. A cage and 11-4 inch rope for hoisting. Work fifty-four men. The ore is treated at the Butte Reduction Works. Herman Hesse, Foreman.

The Belle of Butte, owned and operated by the Butte and Boston Company.

First work of developing this mine commenced about ten years ago. It has been worked by the present Company for about three years. The shaft is down about 500 feet, with stations cut. The ledge is crosscutted and drifted on and stoping out ore is in progress. There are connections from the 400-foot level to surface, and the ventilation on the 400, from here up, is very good. There was no connections between the 400 and 500-foot levels but the main shaft, causing the air in this part of the mine, and where some men were at work, to be poor. The work on the 500-foot level, when I visited the mine, was drifting and working one crosscut. The drifts and crossecuts are timbered with sets, and in nearly all stopes sets are used and then filled with waste which makes the mine very well secured.

Frank Doyle is under-ground foreman.

The East Grey Rock mine is another of the properties owned by this Company. This mine formerly belonged to the Silver Bow

Company. Was purchased by the Butte and Boston three years ago. A three compartment shaft is down 800 feet, timbered with 10x10 inch timbers. The stations cut and the ledges crosscutted and drifted on. There were no connections made from the 300 to surface, only the main shaft. The levels from the 300 to the 700 were connected by uprises. Connections had not been made, as yet, between the 700 and 800.

Crosscuts and drifts were timbered with sets, the stopes with stulls and then filled with waste. There are two ledges, the principal work being done on the south ledge. The air was not very good. I spoke to the foreman about making connections from the 300 to surface. He informed me that they were going to connect the 300 with a shaft sunk on the east end of the claim. The water was pumped from the 800 to the 600 by a sinking pump, where a station pump took it to the 300 and another forced it to surface. A cage, one inch rope and a large 20x48 double cylinder engine used for hoisting.

David Polkinhorn is foreman of this mine.

Silver Bow mine No. 1 and No. 2, owned by the same Company. The work of developing this mine had not progressed very far before it showed it would take rank among the large copper and silver producers of the State. A large three compartment shaft is down 600 feet and timbered with 12x12 inch timbers, with stations at 200, 300, 400, 500 and 600. The ledge crosscutted and drifted on and a great deal of stoping done. The crosscuts and drifts are timbered with sets, the stopes with the same and filled with waste. All timbers used in this mine are square timbers. Connections are made with No. 2 shaft at the 300 and between the 300 and 500. At the 600-foot they intend to connect with No. 2 again. This mine is well timbered and well ventilated. A Knowles pump is used to keep the water out, and cages, 4 1-2x1-2 inch cable and a 14x42 double cylinder engine used for hoisting.

No. 2. A three compartment shaft was down 650 feet and still continuing to sink it.

The Butte and Boston give employment to about 230 men in their mines and have their ore treated at the old Silver Bow mill and the Silver Bow smelter.

The Silver Bow smelter is a large plant built by this Company since they began developing their properties.

C. S. Palmer, Manager, and James Hoatson is Superintendent.

East Grey Rock, owned by the Butte and Boston Mining Company. This part of the claim is worked on a lease. The shaft sunk by the leasers is down 150 feet and the ledges cut and drifted east and west. Stoping is in progress. Timbering and ventilation is fairly good. They employ five men.

The Alice mine, owned and operated by the Alice Gold and Silver Mining Company.

It is about seventeen years since the first work was done on this property. A three compartment shaft down 1,300 feet with stations cut and connections made from the 1,000-foot level to surface. Connections were not made, as yet, between the 1,300 and the 1,000-foot levels, therefore the air below the 1,000-foot was poor. Above this it was good.

Levels are well timbered with sets and some of the stopes, when occasion required, with sets, half sets and stulls. As the stopes are worked out they are filled with waste, making this mine well secured.

When I visited the Alice they were working to make connections with the Magna Charta from the lower levels. Since then sinking the main shaft has been in progress and they have reached a depth of 1,500 feet. A large Cornish pump is in use at this mine to pump the water from this and the adjoining properties belonging to this Company. The water is utilized in furnishing the Alice mills.

The Magna Charta, owned and worked by the same Company. The shaft is down 700 feet, with stations cut and the ledges crosscutted and drifted on. A great deal of stoping done with the same system of timbering and filling in with waste as the Alice.

The 700-foot level of this mine is to be connected with the 1,200 of the Alice.

The ventilation was good.

The Blue Wing is also owned by this same Company. A two-compartment shaft down 650 feet, with stations cut at the 300,

400, 500 and 650 feet; crosscuts and drifts driven which are timbered with sets. The stopes are timbered with stulls, filled with waste. The air was pretty good.

**The Rising Star.** The shaft is down to the 500-foot level. The work being done when I visited the mine was stoping on the 400-foot level.

The Rising Star has been worked at different times for the past nine years and is owned by the Alice Company.

This Company gives employment to about 250 men underground.

They have a sixty and twenty stamp mill where the ore taken from their properties is treated.

Wm. E. Hall is Superintendent of all these mines and William Shovell is foreman of the Alice and Magna Carta.

William Eva has charge of the Blue Wing and Rising Star.

The Lexington mine, incorporated as the "Societe Anonyme des Minis de Lexington," has been inoperation for the past sixteen years. The shaft, a three compartment, is down 1,470 feet, with stations at the 200, 300, 400, 500, 650, 800, 1,000, 1,200 and 1,450-foot levels, and crosscuts run to the ledge, excepting the lower levels, where the ledge was not cut. When I visited the mines stoping was done above the 650. Below that there were no men at work. There are two ledges worked, the principal work being done on the north ledge. The mine is very well timbered, the stopes being filled with waste when the ore is taken out. Ventilation is good where the men were at work. In the lower levels the air was poor, but no men were at work there. This Company intend to prospect from the 1,450 with a Diamond Drill. They use Knowles' pumps for keeping the water out. The engine is 12x 16, double cylinder. A 4.1-2x3-8 inch cable and cages for hoisting. Work thirty-eight men in the mine. A sixty stamp mill is kept going steadily by this Company. Mr. Kellogg has been foreman of this mine for several years.

The Jersey Blue mine, owned by the Jersey Blue Mining Company. Shaft is down 130 feet, and timbered with 8x8 inch timbers. Only work being done was sinking. A Knowles sinker for keeping the water out. A bucket, 7-8 inch rope and 10x12 double cylinder engine for hoisting. Work twelve men.

J. O. Hudnutt is Superintendent and Thomas Hogan foreman.

Wild Bill, worked under lease by O'Shea Bros. A two compartment shaft down 300 feet. The principal work being stopping out the ore above the 150-foot level. There was no work being done below this level. They employ nineteen men.

Glengarry mine, worked by the Glengarry Mining Company. A two compartment shaft is down 350 feet, timbered with 8x8 inch timbers. This mine is very well timbered, the levels with sets and the stopes with sets, half sets and stulls, when the ground requires it, and then filled with dirt.

Ventilation is good. Connections have been made from the 350 to surface.

A Cameron pump was in use, and cage, one inch rope and 8x12 double cylinder engine for hoisting.

Gives employment to thirty-two men, and have their ore treated at the different mills in Butte. W. E. Zuicky, Foreman.

Daniel Quilp mine. This mine has been worked under the management of W. P. Forbes for about three years. A two compartment shaft sunk to the depth of 230 feet, timbered with 8x8 inch timbers. Station was cut at the 100 and the ledge cut. All this part is worked out and abandoned. The workings on the 100-foot level is connected with some old workings done west of where the present shaft is sunk. At the 200 the ledge is again cut and drifting done east and west. In a crosscut going south on the west drift one man was employed. The west drift is timbered with sets, stopes being well filled with waste. Connections were not made between the 100 and 200. The 200 was ventilated with small fan and pipes. The engine was a 6x8 double cylinder, with 3-4 inch rope and bucket for hoisting. Knowles' sinking pump for keeping water out. Were working nine men.

The Elvina mine, R. D. Leggat is sinking a two compartment shaft on this property. The shaft was down 140 feet when I visited the mine. A Knowles sinker was used for pumping and a bucket, 3-4 inch rope and 6x8 double cylinder engine for hoisting. Work ten men.

Gagnon mine, operated by the Colorado Mining and Smelting Company. C. W. Goodale, Manager.

This mine has been worked about fifteen years. The shaft is an incline, at an angle of 73 degrees. Depth 1,000 feet. The shaft is a four compartment from the surface to the 600. From there to the 1,000-foot level it is a three compartment. It is well timbered with 12x12 inch timber, and stations are cut every 100 feet. The ledge is cut and drifted on and being stoped out. The drifts are timbered with sets. The stopes are also timbered with sets excepting where the foot wall is good, half sets and stulls are used. As the ground is worked out the stopes are filled with waste. There is a separate manway, with ladders, to the 800. Connection is made with the Original Butte mine at the 400-foot level, which leads to surface. This mine is pretty well timbered, and ventilation was good from the 800-foot level up. Knowles' pump is used to keep the water out. A one inch rope, skips and 22x36 double cylinder engine for hoisting. Work 150 men. The ore is treated at the Colorado Concentrator and Smelter.

The Nettie, owned and operated by the same Company. The first work of developing this mine commenced about ten years ago. Has been worked continuously for the past five years. The shaft, a two compartment, is down 300 feet, and is timbered with 8x8 inch timbers to the 200-foot level. From there down 12x12 inch timbers are used. Three ledges have been cut and some work done on them. The principal work is being done on the south ledge. There is a winze sunk on the ledge from the 300-foot level; was down 130 feet, with drifts driven, and men were at work stoping out the ore. The mine is timbered with sets, and half sets where the foot wall is good. The air is good, excepting in the winze and in a prospecting tunnel, which runs northeast from the 300-foot station, drifting and crosscutting the formation. Connections are made to surface. A cage, one inch rope and 12x14 double cylinder engine is used for hoisting purposes. Employ seventy-five men, and have their ore treated at the Colorado Smelter.

Star West mine. About six years ago there was some work done on this property. A two compartment shaft was sunk 200 feet and timbered with 8x8 inch timbers.

In July, 1890, the Arlington Mining Company started to work it under lease. They sunk the shaft to the 300 and timbered it with 10x10 inch timbers, crosscutted the ledge and drifted on it and at present are stoping out the ore. The crosscuts and drifts are timbered with sets. The stopes with sets and stulls, as occasion requires, then filled in with waste.

A Knowles sinker throws the water to the 200. It is taken from there to surface by a Cameron pump.

A double cylinder engine, Sx16, cage and one inch rope are used for hoisting.

On the west end they are sinking a two compartment shaft, which is down 100 feet and timbered with 10x10 inch timbers. The ledge is drifted on and some stoping done. A bucket, one inch rope and a 8x10 double cylinder engine for hoisting purposes. Connections are made to surface. Employ forty-three men. The ore is treated at the Colorado Smelter.

C. W. Goodale is Superintendent and William E. Kane foreman.

The Vulcan mine, owned and operated by the Bannister Mining Company.

In 1882 there was some work done on this property. After this there was but little done until the present Company started to work, February, 1890.

A two compartment shaft, down 300 feet, is timbered with 10x10 inch timbers. Stations are cut and drifts driven on the ledge, and stoping out the ore is going on.

They have connections made to surface but the air in places is bad.

The drifts are timbered with sets and the stopes with stulls and then filled with waste. Much of the timbers used are not heavy enough and are of little service when any weight comes on them.

A pump on the 300 throws the water to surface. They employ about forty men. The ore obtained from this mine is shipped to Omaha.

J. H. Steele is Superintendent and C. Gates foreman.

Dispatch mine, worked by R. M. Cobban and James Maloney. There is a two compartment shaft down 250 feet. It is an incline, pitching at an angle of about 50 degrees. No connections were made to surface. Were drifting east and west on the 200-foot level. A bucket, 5-8 inch rope and small engine. Work seven men.

The Shonbar mine, worked by the Shonbar Mining Company. B. J. Fine, Superintendent.

An incline shaft down 400 feet, pitching at an angle of about 40 degrees, and the ledge drifted on. The old timbering in this mine was done several years ago; is not good, while it has been repaired some. It is not what it should be. The work done by this Company is better. There is no connections from the lower levels to surface. The air was not good. A Knowles sinker and Cameron station pump were used for keeping the water out. A 7-8 inch rope and 8x10 double cylinder engine for hoisting. Work sixteen men, with J. H. Pankey as underground foreman.

The Mary Ann mine, worked under lease by B. J. Fine & Co. A two compartment shaft down 100 feet, with a pitch of about 60 degrees. Is timbered with 8x8 inch timbers. The ledge is driften and some stoping done. A Cameron sinking pump keeps the water out. A bucket 3-4 inch rope and 6-8 double cylinder engine for hoisting. Work thirteen men.

The Ophir mine, worked under lease. A two compartment shaft is down 200 feet, and were crosscutting for the ledge when I visited it.

The Isley mine, worked under lease by Joseph R. Davis and Gus Reed. The work done on this mine was stoping on the 50-foot level to surface. Employ thirty-two men on eight hour shift. Ore is treated at the different mills around Butte.

Germania mine. T. Frudenstein has been working this mine since April, 1890.

The shaft, a two compartment, down 300 feet, and timbered with 8x8 inch timbers. Levels 100 feet apart. The levels are timbered with sets, the stopes with stulls, then filled with waste. Some of the timbers used are not strong enough to be of much service. Connections have been made from the 200 to surface. The air on the 300-foot level was not good. A Knowles sinking and Cameron station pumps for pumping the water. A bucket, 7-8 inch rope, and 10x14 double cylinder engine for hoisting.

West of this shaft a two compartment incline, down 220 feet on the ledge, with a pitch of about 45 degrees. The only work being done here was sinking. A bucket, 1-2 inch rope and small engine for hoisting.

This Company work thirty-two men and have their ore treated at the different mills around Butte.

Wm. Dittman has charge of the underground work.

The Blue Bird mine, owned by the Blue Bird Mining Company. James Keller, Manager.

This mine has been worked for about seven years. A three compartment shaft is down 600 feet timbered with 10x10 inch timbers with stations every 100 feet. Connections are made from the 600 to surface and the mine is well ventilated and pretty well timbered. The crosscuts and drifts are timbered with sets the stopes with sets and sometimes stulls are used then filled with waste. The lead in places is several sets wide and takes some time to work out.

A large Knowles pump for pumping the water out of the mine and 14x24 double cylinder engine 4 1-2 inch cable are used for hoisting.

Southwest of this mine they are sinking a two compartment shaft, timbered with 10x10 inch timbers, were down 100 feet when I visited the mine, and sinking was to be continued. A Knowles sinking pump, small engine, bucket and 3-4 inch rope are on the shaft.

This Company employ 150 men underground. The ore is treated at the Blue Bird Mill at Rocker.

James McCann is underground foreman.

Clear Grit Mine. First work done in this mine was in 1878. Worked at present by W. L. Farlin.

A two compartment incline shaft is down 500 feet, pitching about 40 degrees with levels every 100 feet. Connections were made from the 400 to surface, but the ladders were only in places and could not be traveled. The work being done was drifting east and west on the 500-foot level.

The air was fairly good and the timbering done since Mr. Farlin has been working this mine is good. He promised to put ladders in the upraises, and fix them so they could be traveled. A bucket, 7-8 inch rope and 8x12 double cylinder engine for hoisting. P. F. Boland is in charge of the underground work. Employ sixteen men.

Oro Butte. This has been worked by Mr. Farlin since July, 1891. A two compartment shaft is down 135 feet, timbered with 10x10 inch timbers. Sinking was the only work being done on this mine when I visited it. Knowles' sinking pump for pumping the water, 3-4 inch rope and small engine for hoisting. Employ eight men.

The Ramsdell Parrot worked under lease by Fred. Levors & Co. The first work done on this mine was in 1880. The present Company have been working itsince July 1890. The shaft is down 600 feet, timbered with 8x8 inch timbers. Levels driven in different directions. The only work being done when I visited it, was crosscutting on the 600-foot level for the ledge. There was no connections made to surface. This level is to be connected with the Colusa Parrot when the ledge is cut. The air was not good. A 7x10 double cylinder engine, cage and 3-4 inch rope. Nine men are employed.

#### ANACONDA MINING COMPANY'S MINES.

All the mines worked by this Company at Butte closed down on the 20th of March, 1891, and remained idle for a period of seven months. The following mines resumed operation on the 22d of October: Mountain Consolidated Mine, Green Mountain, Wake Up Jim, High Ore Bell, Modoc, Anaconda and St. Lawrence. Marcus Daly is General Manager, and supervises the workings of these mines as well as their smelting plant at Anaconda. When working to their full capacity employ 2,000 men in and around the mines. When I went through these properties 1,425 men were at work in them.

The St. Lawrence and Anaconda. There are two three compartment shafts one on the St. Lawrence and one on the Anaconda.

The former is sunk to the depth of 900, with stations cut and levels driven to the 800.

The Anaconda is down 1,000 feet with stations and levels to the 1,000-foot level. Connections have been made with surface in both mines besides having connection made with each other on different levels. The shafts are timbered with 12x12 inch timbers. Sets are doubled when necessary in these mines and the stopes kept filled with waste. The ledge is large and it requires a vast amount of waste to fill the stopes. The ventilation is good excepting in a few places where it was very warm. A sinking pump and two station pumps are in use at the St. Lawrence to

keep the water out, and a large station pump on the 100 of the Anaconda throws the water to surface. Double deck cages 6x1-2 inch cables and 20x60 double cylinder engines for hoisting pur-are in use at these mines.

Thomas Bulger, Foreman of the Anaconda, and John Kane, fills like positions in the St. Lawrence.

Patrick Kane, Superintendent.

**Mountain Consolidated Mine.** A three compartment shaft timbered with 12x12 inch timbers, is sunk to the depth of 700 feet with station cut and levels driven 100 feet apart. All the levels were connected with upraises from the 500 to surface and men were at work stoping out the ore. This mine is timbered with sets and are doubled when required. The stopes as they are worked out are kept well filled with waste. The walls are heavy and requires being well secured which they are.

The air was good excepting in a few places which were quite warm, as they had resumed operation, but a short time before I visited it, and had not got air courses opened or entirely prepared to conduct the current of air around through all the stopes where men were at work as they would like it.

A large Knowles station pump was in use to keep the water out. Double deck cages, 6x1-2inch cable, 20x60 double cylinder engine for hoisting.

L. Manning, Foreman.

**Green Mountain Mine.** A three compartment shaft timbered with 12x12 inch timbers is down 600 feet with levels driven and stations cut 100 feet apart.

The system of timbering and filling the same as at the Mountain Consolidated.

The ground is very heavy and of a swelling character. During the shut down the drifts and other workings were damaged considerable from the swelling of the walls.

The work being done when I went through it was cleaning up, repairing and retimbering where necessary. Three Knowles sinkers was in use to keep the water out, double deck cage, 5x1-2 inch cable and 18x48 double cylinder engine for hoisting.

John J. O'Mara, Foreman.

Wake Up Jim mine. A three compartment shaft, timbered with 12x12 inch timbers, is down 500 feet, with stations 100 feet apart down to the 400 and connections made to surface.

The work being done was timbering and repairing the shaft.

A Knowles station and sinking pump were in use to pump the water out. Cages, 3x1-2 inch cable and 10x12 double cylinder engine for hoisting.

William Dolan, Foreman.

Modoc mine. A three compartment shaft, timbered with 12x12 inch timbers, is sunk to the depth of 600 feet, with stations and levels 100 feet apart.

Connections were made to surface from the 500-foot level, and were stoping on the upper levels.

The shaft was filled with water up to the 400. They were pumping out the water. This mine is well secured, the timbers used being sets, half sets and stulls, as the occasion requires. Cages, 1 1-8 inch rope and 12x18 double cylinder engine for hoisting.

H. Linnen, Foreman.

High Ore mine. A three compartment shaft, timbered with 12x12 inch timbers, is sunk to the depth of 700 feet, with stations cut and levels driven to the 600-foot level, and connections made to surface.

The Bell mine is worked through the High Ore shaft.

The timbers used in these mines are mostly sets, excepting where the ledge is small stulls are put in. As the stopes are worked out they are kept well filled with waste. The ventilation is good.

A large Knowles pump on the 600 keeps the water out. Cages, 4x1-2 inch cable and 18x36 double cylinder engine for hoisting.

Patrick O'Neill, Foreman.

Joseph Laird is Superintendent over these mines.

M. J. O'Farrell is Assistant Superintendent over the Modoc, High Ore and Bell

All the mines belonging to this Company are very well timbered.

There seems to be no lack of good material for the men to secure themselves against accidents and no restriction on the amount used. The different Superintendents who went through the mines with me said their instructions to the men were, not to work under any bad ground without first securing it, and orders have been given to the engineers to hoist slowly and carefully when men are on the cage, and preventing men to ride on loaded cages, and other rules, if strictly carried out, will guard against accidents.

Between shifts watchmen go through the different mines to see that no candles are left burning or anything that would cause a fire. Extensive preparations have been made to fight fire in or around their mines should occasion require it.

DEPUTY'S REPORT.

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BUTTE, MONTANA, December 8, 1891.

Jos. HOGAN,

*Inspector of Mines:*

I have the honor of presenting herewith my annual report for the year 1891.

I have investigated seven fatal accidents and four non-fatal accidents during the year.

This report contains a brief account of the above stated accidents.

Yours respectfully,

JACOB OLIVER,

*Deputy Inspector of Mines.*

Henry Jenkins, a miner, was instantly killed at the Drum Lummon mine January 14th. It seems that the deceased had left his place of work and was going down the Empire shaft, and from some reason unknown fell out of the ladder, with the above stated result. Inquest held and a verdict of accidental death rendered.

Daniel Conner, a car man was instantly killed at the Anaconda mine January 20th by being caught between the cage and shaft timbers. It seems that Conner, who was working on the 40-foot station, had been on top and forgotten his mittens. The cage, which had been rung to the top, was stopping at the station at the time. Conner jumped on the cage just as it started, when he was caught between the wall plate of the shaft and the cage. The accident was due entirely to the carelessness of the deceased.

Robert Corbett and James Clunie, miners were seriously injured at the Ida May mine February 3rd by being blasted. These men were working on the day shift in the bottom of the shaft. The men on the night shift had blasted two holes but one missing fire they told Corbett and Clunie of it. Corbett was cleaning this hole out when it exploded. There was two sticks and a half of giant powder in the hole at the time.

Thomas Dunn, a timberman, was killed at the Alta mine June 19th by a fall of rock. The deceased was working at the time on the 900-foot level preparing for a set of timbers, and whilst in the act of cleaning the sill to put in the post about two tons of rock from the hanging wall fell on him, killing him instantly. Inquest held and a verdict of accidental death returned.

Andrew Prine, a miner, was killed at the Pikes Peak mine June 28th, by being struck with a bucket. The deceased was working at the bottom of the shaft with the others. They had filled a bucket of dirt and sent it up, when Prine started to work right under the bucket when the clutch of the engine slipped, letting the bucket down the shaft with the above stated result. Inquest held and a verdict of accidental returned.

Duncan McPhail, a carman, was seriously injured at the Nettie mine July 23rd by being struck with a car, and has since died. It seems that McPhail, who was running car on the 300-foot level, was in the act of taking a car off the cage when the engineer took the cage away slowly, the car striking the wall

plate of the shaft, holding it there, when McPhail rang two bells to lower. When the engineer lowered the cage the car fell off, striking McPhail with the above stated result.

William Parker, a miner, was killed at the Pikes Peak mine September 1st. Parker was engaged cleaning out the 100-foot level, which had not been worked for some time, when one of the stulls gave way, completely burying him. Inquest held and a verdict of accidental death returned.

Henry Nankivel, a miner, was seriously injured at the Grey Rock mine October 18th. Nankivel was working in the stopes between the 600 and 700-foot levels picking down some rock when some ground from the hanging wall fell on him, breaking his arm and otherwise injuring him.

Jerry Hurley, a miner, was killed at the Anaconda mine October 30th. It seems that Hurley, who was working on the 800-foot level, was going to his place to work, on the second floor, when he fell through one of the waste holes, a distance of seven feet, with the above stated result.

Dennis Sullivan, a miner was instantly killed at the Parrot mine November 1st by being blasted. It seems that the deceased, who had drilled a hole, went after powder and fuse to blast with and while in the magazine it exploded. No one being near at the time it was impossible to tell the cause of the explosion. Inquest held and a verdict of accidental death returned.

